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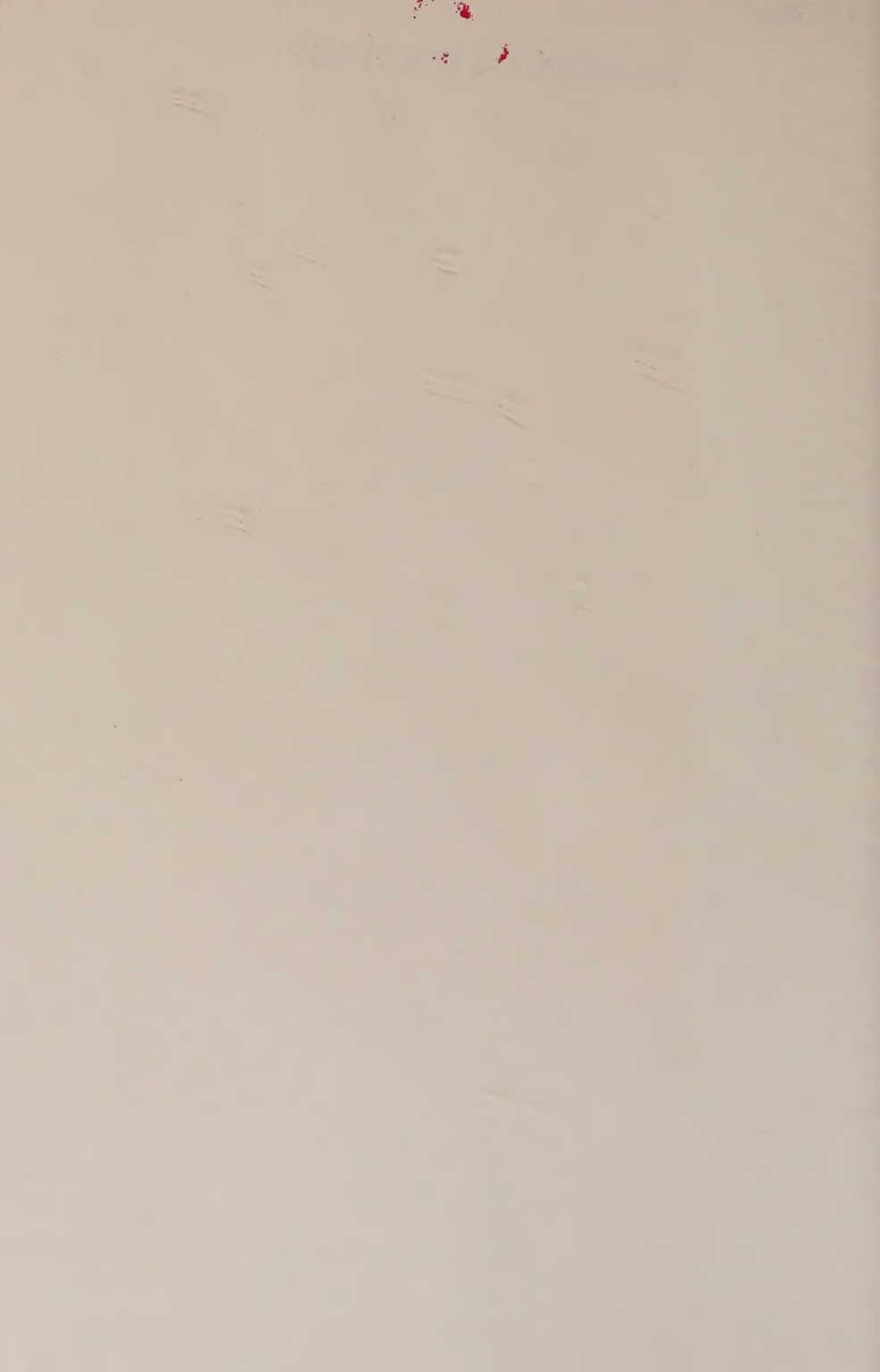
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OBERT PHOTO

Both native and exotic cacti are artistically arranged in the rock garden of the Santa Barbara Museum of Natural History.

CACTI *and other* SUCCULENTS

AN ANNOTATED LIST OF PLANTS
CULTIVATED IN THE SANTA BARBARA REGION



COMPILED AND REVIEWED BY
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*To the Garden Owners who have made the Garden Tours
of Santa Barbara and Montecito possible
and*

*To those who, in developing the City Parks, Blaksley Botanic Garden
and the Museum of Natural History have increased the people's
knowledge and appreciation of the flora of the
Santa Barbara region—*

This co-operative effort is gratefully dedicated

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CACTI AND OTHER SUCCULENTS

INTRODUCTION

This booklet on Cacti and other Succulents, published by the Garden Tours Committee, is the first of what is hoped to be a series of pamphlets listing the varied plant material of the Santa Barbara region. It has been primarily designed for the use of garden owners, as an aid in the identification of species, and to stimulate an interest in the acquisition of new varieties. It is hoped that it will also prove of value to botanists and horticulturists specializing in this class of plants, particularly because no group list of succulents seems to have been compiled to date.

The following list includes nearly 1,000 species of cacti and other succulents now in cultivation in the Santa Barbara region. While some of these may be found in collections along the Pacific Coast, in Arizona, and New Mexico, many others can only be grown outdoors in a frostless region. Elsewhere they are hothouse or indoor plants.

The term cactus has a definite scientific content and applies to all plants belonging to the family Cactaceæ, most of which are spiny. The term succulent is a general term for plants with fleshy leaves or stalks, generally from arid or semi-arid regions, many of which are grown in collections with cacti. Succulents belong to a number of different families, some members of which may be succulents and others not. For instance, the genus *Euphorbia* includes many species which might be taken for cacti and others such as *Poinsettia* which are not included in a succulent collection. The genera which make up the bulk of the succulent collection are *Agave*, *Aloe*, *Yucca*, *Mesembryanthemum*, and the group which includes *Sedum*, *Semprevivum*, *Echeveria* and *Cotyledon*.

ARRANGEMENT OF LIST

It seems best to group the species in the following list according to their family relationship but to list the genera and species alphabetically under each family. The subdivision into tribes has been omitted. The name, habitat, and description of cacti are taken from Britton and Rose's Cactaceæ; of other families containing succulents, from Bailey and other authorities.

The brief descriptions pertaining to families and genera are added to make the list of greater interest and value to garden owners. For the sake of consistency and in accordance with current practice no specific names are capitalized.

In the literature dealing with cacti and succulents, there is an unfortunate lack of agreement as to name. Families are constantly being revised so that the latest authorities use new names for plants that have been long known to collectors and dealers as

something else. In this booklet the older and better known name is given as a synonym under the newly adopted one, except where a revision is now under way, as in the genus *Mesembryanthemum*.

A very few species lack description. Most of these are recent introductions into this country, which are not listed in available authorities. Undoubtedly a number of species have been overlooked, and there is a small number the identity of which is not definitely established because the collaborators have not been able to check the description of flower and fruit. The number of species of cacti is rapidly increasing in Santa Barbara, and although the list of other succulents is growing also it is now considered fairly representative of the whole Pacific Coast region.

One of the purposes of the list is to bring out further information which will lead to a more complete record. Suggestions and additions and corrections to the list are invited. These should be sent to the Museum of Natural History.

COLLECTING CACTI

In four of the southern counties of California in which cacti grow abundantly the collection of them, except by special permit, has been forbidden. Arizona has restricted the collection of cacti, and a strict quarantine has been placed by California authorities on the importation of Arizona material into this state. Growers are therefore advised to obtain their plants only from authorized dealers who are known to be complying with all regulations. Smuggling specimens into the state or buying from "bootleggers" is unworthy of true friends of horticulture who should realize that state and government regulations are passed either to preserve the natural beauty and interest of the landscape or to guard the plants in our gardens and farms from the attacks of insects and disease.

SUCCULENT COLLECTIONS

There are a number of excellent collections of cacti, of other succulents, and of both in Santa Barbara and Montecito. It is fortunate that in the three gardens where the public is always welcome a great variety of plants may be seen; at the Blaksley Botanic Garden in Mission Canyon there is an extensive collection of plants native to the western desert and the Pacific Coast; at the Museum of Natural History, near the Old Mission, there is a varied collection of cacti and succulents including both natives and exotics; at El Fureidis, in Montecito, J. Waldron Gillespie has one of the oldest collections, begun in 1893. This famous garden is open on week days to the public. A number of the nurseries in Santa Barbara also make a specialty of cacti and succulents.

Aside from the Mission Cactus, long ago planted for its edible fruit, the oldest specimens of cultivated cacti and succulents probably

do not date back to earlier than the nineties when Dr. Emanuele Franceschi Fenzi, the distinguished Italian horticulturist, began the introduction of African, Central American and other exotics. Some of these old plants show what time will produce in the way of splendid specimens and many garden owners are now making extensive collections of cacti and succulents with the feeling that they are planting for long time effects.

For persons in the vicinity of Los Angeles, the long established collection of the Huntington Botanic Garden should prove of great interest.

The illustrations included in this book show examples of the varied and interesting use of cacti and succulents in Santa Barbara and Montecito gardens.

Deep appreciation must here be expressed for the valuable assistance rendered over a period of many months by those who have assisted in the difficult tasks of cataloguing and verifying descriptions from the widely scattered literature.

RALPH HOFFMANN.

June, nineteen hundred and thirty.

THE LANDSCAPE VALUE OF SUCCULENTS

RALPH T. STEVENS

Landscape Architect

The group of plants known as succulents, including the ornamental cacti, are most effectively used in a garden scheme in Southern California by arranging them naturally in a place by themselves. In as much as these plants have fleshy leaves and stems, they are subject to rot and therefore the position selected should be well drained.

LOCATION

The ideal situation is a gentle slope facing the south and in the full sun. As a class they are associated with the desert and consequently best exhibited among large weathered stones. The position is further enhanced when there is a background of some sort, either foliage, fence, or best of all, a stone wall or the plastered wall of a building. Contrary to general belief these plants require considerable food and the soil should be a good open porous one with preferably a certain amount of sand on or near the surface. They are not successful in a hard clay soil which is apt to become overwet.

They can also be placed to advantage by massing them on either side of house entrances and driveways. They are not well used when associated with other types of foliage as they are distinctive in effect and demand particular cultural treatment.

PREPARATION OF SOIL

When used in an area by themselves, the first operation is to rough grade the ground, taking care to eliminate any low places where water might stand in winter. Large weathered sandstone boulders of various sizes are then arranged in informal groups, leaving pockets or open spaces between. The boulders should be partly buried and be selected because of their irregularities and characteristic arrangement. The larger growing types, as the Agaves and the Furcræas, should then be "spotted" by massing them in the background, against the face of the walls, or placing them individually as specimens against the lower face of the boulders, if the ground is sloping. Certain types may actually be leaned against the stone itself, both to help support the plants and to make more effective their outline. If cacti are placed in ordinary soil, each plant should have immediately under it, a small amount of creek sand, to keep the soil from coming in direct contact with the stem.

The medium sized varieties, as the Aloes, Yuccas, Euphorbias and cacti are then planted in front of these and massed or interplanted between the larger individuals.

The smaller types including those that spread and cover the ground are then arranged here and there to complete the picture, with particular care to place the rare and dwarf types in the foreground and especially along the edges of walks and stepping stones. Certain particularly choice and small varieties may be "chinked" in crevices between the boulders, where they are protected and will not be lost. Succulents are especially fond of being placed near a stone as the rock collects heat faster and holds moisture longer during droughts. Many of the creeping varieties such as the ice-plants are effectively used over steep banks and from the tops of walls.

If one part of the area is more arid and stony than the rest, the many varieties of true cacti can be concentrated there as they will stand more drought than the others.

Because of the difficulty in controlling grass and weeds and because the individual is better exhibited, the surface of the ground should be covered with a thin layer of crushed stone, preferably decomposed granite.

APPROPRIATELY USED IN CALIFORNIA GARDENS

Because of the increasing interest shown in all this class of plants, many new varieties have lately been introduced, and due to their suitability to the climate of Southern California and to their effectiveness when associated with Californian types of gardens and of architecture, there should be a renewed interest taken in the landscape use of these plants. It should always be kept in mind however that our interest in cacti and succulents is largely due to the botanical differences between varieties and this can best be maintained when they are closely associated together so that their varying characteristics may be compared.

HINTS ON THE CARE OF SUCCULENTS

E. O. ORPET, *Horticulturist*

Superintendent of Santa Barbara City Parks, 1919-1929

Santa Barbara has long been known for its rich collections of heat and drought resistant plants that are collectively known as Xerophytes, or succulents, largely because they have the propensity of storing up moisture when it is present and the ability to live on the stored moisture through the long summer without a further supply. Cultivators are prone to reason from this that plants of this nature do not need water during the dry season, but this is easily disproven by the large number of fine specimens we see in gardens that get a regular supply of moisture at the roots. The fact is that Aloes, Agaves, Sempervivums, Echeverias and most of the cacti will take and enjoy as much water as cabbages, and only when they receive water the year round do we see specimens at their best and in the finest bloom.

The California Desert cacti are most impatient of an overdose of water especially when recently planted. Their roots are surprisingly few in comparison with the size of the plants and these are often injured in transplanting to such an extent that they die and a new series of roots have to be formed. The gathering of cacti in the deserts is now restricted by law, but it is possible to bring in a limited number.

In packing for transit it is best to use little packing material; if very much dried a spraying with water for a day or two will help the plants recover the moisture they have lost.

Cacti and most succulents are readily multiplied either from seeds, cuttings or by grafting.

MIXED SOIL

A good soil for cacti, where one mixture has to serve all varieties can be made from one-fourth peat, one-fourth black loam, one-half sharp sand and about one-twentieth of this amount of pulverized charcoal. This soil is satisfactory for both young and tender plants but the proportion of sand in the mixture should be greatly reduced for coarse and heavy cacti.

POTTED PLANTS

If plants in small pots are exposed for too long a season to the blazing sun the roots burn and it is then practically impossible for them to make any growth. Some who keep their plants in pots all the time bury them in drained holes during the hottest part of the summer. This is advisable in hotter, drier climates than Santa Barbara.

Most of the succulents grow well in pots or other receptacles. There is a belief that glazed pots are not suitable, but if broken shards are placed in the bottom with a covering of moss for the free egress of water, so providing drainage, these ornamental pots are as well suited as others, and if placed in full sun where most succulents thrive best, the pots with glaze are better than the common ones, for they are less porous. The addition of a few sedums around a cactus specimen is a great help to those that are of weak root action. The sedums absorb all surface water and help to give good root drainage. Small dishes can be used without drilling a drainage hole if sedums are interplanted with the other specimens. The advice to owners of "miniature gardens" is to water two or three times a week but to keep the soil on the dry side and to give them plenty of sun.

The following lists may be of help to amateur growers.

TWELVE HARDY SUCCULENTS SUITABLE FOR GENERAL CULTIVATION

Agave lophantha	Echeveria rosei
Aloe striata	Echeveria simulans
Byrnesia weinbergii	Kleinia mandraliscæ
Cotyledon orbiculata	Oliveranthus elegans
Crassula lactea	Sempervivum tectorum
Echeveria gibbiflora var. metallica	Stapelia variegata

TWELVE CACTI EASILY GROWN IN THIS REGION

Bergerocactus emoryi	Ferocactus viridescens
Chamæcereus silverstrii	Hamatocactus setispinus
Cereus peruvianus	Myrtillocactus geometrizans
Echinocactus grusonii	Neomamillaria hemisphærica
Echinocereus rigidissimus	Opuntia monacantha var. variegata
Echinopsis multiplex	Trichocereus spachianus

TWELVE PLANTS SUITABLE FOR DISHES OR MINIATURE GARDENS

Crassula lycopodioides	Haworthia <i>varieties</i>
Dyckia sulphurea	Mesembryanthemum rhomboideum
Echeveria elegans	Opuntia salmiana
Echinopsis <i>varieties</i>	Sedum adolphi
Euphorbia echinata	Sedum pachyphyllum
Gasteria <i>varieties</i>	Sempervivum arachnoideum

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Addisonia; published by the New York Botanical Garden, *passim*. (Many papers on the newer genera and species of North American Succulents. Illustrated in color.)

PERIODICALS

- Desert Magazine*; Desert Magazine Publishing Co., Box 67, Pasadena, California. \$1.50 a year.
- Journal of the Cactus and Succulent Society of America*; 1800 Marengo Street, Los Angeles. Including membership, \$3.00.
- Monatsschrift der Deutschen Kakteengesellschaft*; Berlin-Dahlem, Botanisches Museum. Including membership, \$3.00. (Organ of the German Cactus Society, formerly published under the titles *Zeitschrift für Kakteenkunde* and *Zeitschrift für Sukkulantenkunde*. Back numbers contain much valuable material.)
- South African Gardening*; Specialty Press, Box 388, Cape Town. 12 s. (Publishers of Mrs. Bolus' and Dr. Marloth's articles on South African Succulents. General gardening paper.)
- Succulenta*; *Maandblad van de Nederlandsche Vereeniging van Vetplantenverzammelaars*; Leeuwarden, Netherlands. About \$2.00. (Organ of the Dutch Cactus Society.)

ABBREVIATIONS

Adj.—adjacent.	Isl. or isls.—island or islands.
C. or cent.—central.	Lf. or lvs.—leaf or leaves.
Diam.—diameter.	Mts.—mountains.
E.—east.	N. or No.—north.
Fl. or fls.—flower or flowers.	S.—south.
Fr. or frs.—fruit or fruits.	Son.—Sonora.
Ft.—foot or feet.	St. or sts.—stem or stems.
Hort.—hortorum, garden grown.	Trop.—tropical.
In.—inch or inches.	Var.—variety (of species).
Infl.—inflorescence.	W.—west.

States and countries—usual abbreviations, i. e., L. Calif.—Lower California; and Son.—Sonora.

The most persistent abbreviation in the booklet is the use of the initial letter to represent the generic name. Thus in ACANTHOCEREUS, the first genus, the letter A. is used to introduce the species,—**A. horridus** meaning ACANTHOCEREUS **horridus**; and **A. pentagonus** meaning ACANTHOCEREUS **pentagonus**; and so on through the booklet.

Names of authors, following the botanical names of species, are usually abbreviated as in Bailey, and Britton & Rose. Where two authors are listed, the first, in parentheses, represents the oldest authority for that specific name; i. e., in the case of ACANTHOCEREUS **pentagonus** (Linn.) B. & R., (Linn.) refers to Linnæus, and B. & R. to Britton & Rose.

Special abbreviations appearing at end of descriptions refer to the location of identified specimens. Those not so designated were found in nurseries.

ap—Alameda Park
bbg—Blaksley Botanic Gardens
gg—Gillespie Garden
hp—Hillside Park
mnh—Museum of Natural History
All single letters refer to private gardens.

BOTANICAL TERMS

A few botanical terms are used in the descriptions, as follows:

Areole,—that portion of a joint of cactus which bears spines, bristles or flowers.

Bulbil,—a small bulb formed on inflorescence.

Cæspitose or cespitose,—tufted, or growing in low dense clumps.

Carpel,—the part of a flower containing the ovules and later ripening into the fruit.

Caulescent,—having a stem or stems.

Ciliate,—hairy-margined, like the eyelashes.

Clavate,—club shaped.

Common,—as used in this book means common in Santa Barbara region.

Connate,—more or less united, or grown together.
Decurrent,—running down the stem, in the case of leaves.
Dichotomous,—two-branched.
Diurnal,—relating to the daytime, day-blooming.
Epiphytic,—growing on trees.
Fascicle,—a compact cluster.
Glabrous,—smooth, having no hairs.
Glaucous,—bloomy gray, passing into grayish blue.
Globose,—globular.
Imbricated,—overlapping.
Inflorescence,—mode of flowering, in reference to flowers on stems.
Lanceolate,—lance shaped, i. e., 3-6 times as long as broad, pointed at apex, and widest below middle.
Monocarpic,—dying after seeding once.
Ob lanceolate,—similar to lanceolate, but broadest above middle.
Obovoid,—egg shaped, with smaller end basal.
Orbicular,—circular or rounded in outline.
Ovoid,—egg shaped, with broader end basal.
Papillose,—bearing small, translucent warts.
Peltate,—attachment of leaf stalk not marginal.
Porrect,—extended horizontally.
Procumbent,—bent down.
Proliferous,—reproducing by buds or offsets.
Raceme,—an elongated flower cluster bearing the individual flowers on stalks that are unbranched.
Scabrid,—rough.
Setose,—bristly.
Subglobose,—not quite globular.
Subshrub,—small plant with stems woody at base only.
Terete,—cylindrical.
Tortuous,—twisted.
Tubercle,—wartlike protuberance.
Undulate,—wavy margined.
Viscid,—sticky.
Whorl,—a ring of 3 or more leaves arranged around the stem at each node.
X,—hybrid.



OBERT PHOTO

The sloping ground of this private garden shows the cactus planting to fine advantage, the columnar accent in the background, and the contrasting form of the barrel cactus is effective

PART I---CACTI

CACTACEÆ

A name used by the ancients to denote any spiny plant. Fleshy plants with watery or milky juice, a great reduction or complete absence of foliage, and very thick, rather sparingly branched, rarely unbranched stems. Thirty-three species have been identified as native of California.

ACANTHOCEREUS

Weak, elongated, many-jointed cacti, at first erect but soon clambering or trailing, the joints usually strongly 3-angled, sometimes 4- or 5-angled, in one species sometimes 7-angled, the seedlings and juvenile branches not so strongly angled, with more ribs and with different spines; fls. nocturnal; fr. spiny or naked, with a thick, dark-red skin breaking irregularly from top downward; flesh red.

A. horridus B. & R.

Guatemala. Plants stout. Fls. white, nocturnal. w.

A. pentagonus (Linn.) B. & R.

(*Cereus pentagonus* Haw.)

(*Cereus undulosus* D C.)

S. Fla., coast of Tex., S. to Guatemala and Panama; coasts of Colombia, Venezuela and Guadalupe. Sts. clambering, usually 7-10, sometimes 23-24 ft. high; more or less arched, when growing in open. Fls. green and white. Nocturnal.

ANCISTROCACTUS

Small globular or short-cylindric plants, indistinctly ribbed, strongly tubercled, very spiny. Fls. rather small. Fr. oblong, greenish, juicy.

A. brevihamatus Engelm.

(*Echinocactus brevihamatus* Engelm.)

Tex. Globular to obovoid, 2-4 in. high, 2-3 in. in diam., dark green. Ribs usually 13, compressed, strongly tubercled. Fls. rose-colored, mid-rib darker colored than margins. Fr. about $\frac{1}{2}$ in long. w.

A. scheeri (Salm-Dyck) B. & R.

S. Tex. and N. Mex. Globular, $1\frac{1}{2}$ -2 in. bbg.

APOROCACTUS

Slender, vine-like cacti, creeping or clambering, sending out aerial roots freely. Fls. pink to red, day-blooming. Fr. globose, small, reddish.

A. flagelliformis (Linn.) Lem. RAT-TAIL CACTUS.

(*Cereus flagelliformis* Mill.)

Mex., Cent. Amer., S. Amer. At first ascending or erect, often prostrate and creeping. Fls. crimson.

A. leptophis (D C.) B. & R.

(*Cereus leptophis* D C.)

Mex. Often creeping. Fls. red.

ARIOCARPUS

Plants spineless, usually simple, low, with a flat or round top; tubercles tough, horny, triangular, spirally arranged, the lower part being tapered into a claw, the upper or blade-like part expanded; fls. white to purple; fr. oblong, smooth.

A. fissuratus (Engelm.) Schum. LIVING ROCK.

W. Tex. and N. E. Mex. Flat, hardly above ground. Fls. white to purple. bbg.

A. kotschubeyanus (Lem.) Schum.

Cent. Mex. Plants 1 ¼-2 in. broad, only first crown appears above ground. Fls. rose-colored to light purple.

A. retusus Scheid.

(*A. furfuraceus* Thompson.)

Mex. Globular, to 5 in. broad. Fls. white.

ASTROPHYTUM

Plants globular or more or less flattened to short-cylindric; ribs few, very prominent, more or less covered with white, radiating, hairy scales; fls. yellowish with a reddish center, soon fading; fr. globular.

A. asterias (Zucc.) Lem. SEA URCHIN.

N. Mex. Much depressed, ⅔-1 ½ in. high. Fls. yellow.

A. myriostigma Lem. BISHOP'S CAP.

N. Cent. Mex. Solitary or cespitose, globular to cylindric.

A. ornatum (D C.) Webb.

Mex. Sub-globose to cylindric, 12 in. high. Fls. lemon yellow. o.

BERGEROCACTUS

Low, much branched cactus, with stout, cylindric, spreading or ascending branches; ribs many, low; fls. small, pale yellow; fr. globose.

B. emoryi (Engelm.) B. & R.

(*Cereus emoryi* Engelm.)

S.W. Calif., N.W. L. Calif., and adj. isls. Branches 8-24 in. long; 1-2 ½ in. diam. Fls. pale yellow. bbg.

CACTUS

Plants solitary or clustered, globular to short cylindric, sometimes depressed, at least when young, one-jointed; ribs mostly straight, rarely spiraled; fls. small, pinkish, appearing in the mid-afternoon; fr. red or rarely white.

C. intortus Mill. **TURK'S CAP.**

Bahamas and S. E. Indies. Globose to cylindric, sometimes 3 ½ ft. high. Fls. pinkish. w.

C. maxonii Rose.

Guatemala. Depressed, globose, 4-6 in. high. Fls. rose-colored. w.

C. melocactus Linn.

(Melocactus communis Link & Otto.)

S. Jamaica. Short-cylindric. Fls. pinkish.

CARNEGIEA

A large, columnar cactus with stout, erect, many-ribbed sts. and branches; fr. an oblong, ellipsoid or somewhat obovoid berry splitting down from top into 2 or 3 sections, containing red pulp.

C. gigantea (Engelm.) B. & R. **GIANT CACTUS. SAGUARO.**
(Cereus giganteus Engelm.)

Ariz., S. E. Calif., Son. St. simple, upright, to 40 ft. high. Fls. white. Fr. edible. bbg.

Note: Adopted as the state flower of Arizona.

CEPHALOCEREUS

Elongated cacti, various in habit, mostly columnar and erect, sometimes much branched with a short trunk or in one species with spreading and procumbent branches; fls. nocturnal; fr. usually depressed-globose, sometimes oblong.

C. cometes (Scheidw.) B. & R.

(Cereus cometes Scheidw.)

San Luis Potosi, Mex. Erect, cylindric; ribs 12-15 (Schumann says 9-12), scarcely tuberculate, obtuse; neither fls. nor fr. known.

C. euphorbioides (Haw.) B. & R.

? 10-17 ft. high, columnar, usually simple. Fls. rose red, nocturnal. w.

C. leucocephalus (Poselg.) B. & R.

(Pilocereus leucocephalus Poselg.)

S. and S. E. Chihuahua, Mex. Plants 7-16 ft. high, branched below, the branches 3-15, erect or ascending; ribs usually 12, low. Fls. and fr. not seen.

C. maxonii Rose.

(Cereus maxonii Vaupel.)

Guatemala. 7-10 ft. high, branches erect or nearly so; tops of branches clothed with white hairs. Fls. purple, nocturnal. mnh.

- C. nobilis** (Haw.) B. & R.
St. Christopher to Granada. Much branched and spreading, ultimate branches slender, erect. Fls. purple, nocturnal. w.
- C. sartorianus** Rose.
Vera Cruz, Mex. To 16 ft. high, bluish green. Areoles producing cobwebby hairs. Fls. dirty rose-red. w.
- C. senilis** (Haw.) Pfeiff. OLD MAN.
Mex. Tall, slow-growing, columnar, sometimes branched at base, branches becoming nearly parallel with parent. Areoles bearing a short, sharp, white bristle and 20-30 white, wavy, coarse hairs, 2-10 in. long. Fls. nearly 4 in. long, reddish outside, white within. Fr. violet.

CEREUS

Stems mostly upright and tall, but sometimes low and spreading or even prostrate, generally much branched, the branches strongly angled or ribbed; fls. nocturnal; white except in one species red; fr. fleshy, red, rarely yellow, splitting down one side when mature, often edible.

- C. alacriportanus** Pfeiff.
(**C. peruvianus** var. **alacriportanus** Schum.)
S. Brazil and Paraguay. Sts. up to 7 ft. high; ribs mostly 5, strongly compressed, $1\frac{1}{4}$ in. high, separated by deep sharp intervals, rounded on the edge. Fls. about 9 in. long, white with a rosy tinge.
- C. hexagonus** (Linn.) Mill.
S.W. Indies and No. S. Amer. To 50 ft. high, usually branching near base, with trunk 16 in. in diam. Fls. white, nocturnal. b.
- C. hildmannianus** Schum.
E. Braz. Plant tall, up to 17 ft. high, often branched; ribs 5 or 6, high, thin, rounded, green or often with large yellow patches along the sides. Fls. funnellform, white.
- C. jamacaru** D C.
Braz. To 33 ft. high, short thick woody trunk, much branched. Fls. white. Fr. large, bright red. Nocturnal.
- C. monvilleanus** (Usher) Schum.
Uncertain; perhaps Peru, Bolivia or Ecuador. Columnar, branching. Fls. nocturnal.
- C. pernambucensis** Lem.
(**C. formosus** Forst.)
Braz. and Uruguay. Plants various in habit; growing in clumps to 17 ft. broad, or creeping or sprawling to 16 in. high. Spines 4-10, yellowish. Fls. white or purplish. Nocturnal.
- C. peruvianus** (Linn.) Mill.
Uncertain; from Jamaica or coast of Peru. To 53 ft. in height, tree-like; much branched. Fls. red and white, nocturnal.
- C. peruvianus** var. **monstrosus** (D C.) B. & R.
Similar to *C. peruvianus*, ribs often broken into irregular tubercles. Fls. nocturnal.

C. repandus (Linn.) Mill.

(*Pilocereus repandus* Schum.)

Curacao, Aruba, and Bonaire. A tall, tree-like plant, with a much-branched top; branches grayish green, usually upright or somewhat curved below, bearing numerous constrictions 8 in. apart; ribs usually 9 or 10, about $\frac{1}{2}$ in. high. Fls. nocturnal, dark green except inner tips. Fr. dark red (occasionally white), oblong, about $1\frac{1}{2}$ in. long, flesh white.

C. validus Haw.

(*C. hankeanus* Web.)

Arg. Shrubby, 7 ft. high or more, branched. Fls. reddish, nocturnal.

C. variabilis Pfeiff.

Coast of C. Braz. Creeping or clambering, to 13 ft. high. Spines yellowish. Fls. white. w.

C. xanthocarpus Schum.

Paraguay. Tall, tree-like, somewhat branched, very spiny at apex. Fls. nocturnal, yellowish green below, whitish green above. Fr. yellow, oblong, nearly 3 in. long, flesh white.

CHAMÆCEREUS

Plants small, usually creeping and forming little clumps; fls. diurnal, scarlet; fr. small, dry or nearly so.

C. silvestrii (Speg.) B. & R. PEANUT CACTUS.

(*Cereus silvestrii* Speg.)

Arg. $1\frac{1}{2}$ -2 in.; usually prostrate. mnh.

CLEISTOCACTUS

Slender, erect or clambering cacti, with numerous low ribs; fls. red to green; fr. small, globular, highly colored, pulp white.

C. areolatus Riccobono.

(*Cereus areolatus* Muhlenpf.)

C. Andes of S. Amer. Shrubby to 6 ft. high, erect, branching from near base; joints elongated, ascending, about 2 in. in diam.; ribs 12-15, grooved transversely. Fls. dark to violet rose, about $1\frac{1}{2}$ -2 in. long.

C. baumannii Lem.

(*Cereus baumannii* Lem.)

Arg. Reported from Paraguay and Uruguay. Somewhat branching at base. Sts. fairly tall, $1-1\frac{1}{2}$ in. in diam. dark green. Ribs 12-16. Fls. orange to scarlet. Fr. red with white pulp.

COPIAPOA

Simple, globular to elongate cylindric, or in one species forming large clumps or mounds containing hundreds of simple globular sts.; fls. yellow or sometimes tinged with red; fr. small, smooth.

C. echinoides (Lem.) B. & R.
(Echinocactus echinoides Lem.)

Reported from Bolivia, but perhaps from that part of Bolivia now belonging to Chile. Simple, globose. Fls. pale yellow.

CORYPHANTHA

Plant body globular to cylindric, either solitary or cespitose; tubercles, except the very earliest ones, grooved on upper surface; fls. large and showy, generally yellow, sometimes purple or red; fr. large, ripening slowly, ovoid to oblong, greenish or yellowish.

C. aggregata (Engelm.) B. & R.

W. N. Mex., S.E. Ariz., and N. Son. Globular to short oblong, cespitose. o.

C. alversonii Engelm.

S. Cal. and S. Nev. Cylindric, solitary or in clumps, about 8 in. in height. Spines dark. Fls. lavender. o.

C. bumamma (Ehrenb.) B. & R.

Mex. Globular; tubercles few, very large, bluish green. Fls. large, yellow.

C. chlorantha (Engelm.) B. & R.

(Mammillaria chlorantha Engelm.)

S. Utah., W. Ariz., Cent. Nev., S.E. Calif. Cylindric, sometimes 8-10 in. high; 3-3½ in. in diam. Fls. yellow or greenish yellow. w.

C. cornifera (D C.) Lem.

(Mammillaria cornifera D C.)

Mex. Not cespitose, globose, pale green. Tubercles short, broad, about 5 in. high. Fls. yellow, tinged red. w.

C. deserti (Engelm.) B. & R.

S. Calif. and S. Nev. Cylindric, 8 in., solitary or in clumps. Spines lighter than *Coryphantha alversonii*. Fls. white. mnh.

C. echinoidea (Quehl) B. & R.

(Mammillaria echinoidea Quehl.)

Mex. Solitary, globular or a little broader than high. Fls. rose colored. o.

C. echinus (Engelm.) B. & R.

(Mammillaria echinus Engelm.)

W. Tex. Solitary, globose to subconic, 1-2 in. in diam. Fls. yellow.

C. elephantidens Lem.

(Mammillaria elephantidens Lem.)

Cent. Mex. Simple, sub-globose, to 6½ in. high and 8 in. broad. Fls. rose colored. o.

C. erecta Lem.

Mex. Body cylindric, yellowish-green, white-woolly at apex. Fls. large, yellow. m.

C. macromeris (Engelm.) Lem.

S. N. Mex., W. Tex. and Chihuahua S. to Mex. Branching at base, often many headed, up to 8 in. long. Fls. purple.

C. muhlenpfordtii Poselg.

(**Echinocactus muhlenpfordtii** Poselg.)

Mex. Plants nearly globular, usually simple, short-oblong, 5-8 in. in diam., tubercles large. Fls. yellow. Fr. greenish, oblong. w.

C. neo-mexicana Engelm.

(**Mammillaria neo-mexicana** A. Nelson.)

W. Tex., N. Mex. and N. Chihuahua. Plant usually solitary, globular to short-oblong, 3 ½-5 in. long. Fls. purplish. w.

C. pectinata (Engelm.) B. & R.

(**Mammillaria pectinata** Engelm.)

S. Tex. and adj. Mex. Usually simple, globose, 1-2 in. diam. Fls. yellow.

C. poselgeriana Dietr.

(**Echinocactus poselgerianus** Dietr.)

Mex. Plant-body large for the genus, globular, bluish green. Tubercles large, closely packed together. Fls. 1 ½-2 in. long and nearly as broad when expanded, flesh-colored. Fr. oblong, ½ in. long. w.

C. pottsii Berg.

(**Mammillaria pottsii** Scheer.)

Chihuahua. Narrowly cylindrical, 10 in. high. Spines very needle-like, white.

C. recurvata (Engelm.) B. & R.

(**Mammillaria recurvata** Engelm.)

Ariz. and Mex. Plant body depressed-globose, 4-8 in. diam., forming large masses 1-3 ft. in diam. Fls. lemon yellow. o.

C. robustispina (Schott) B. & R.

S. Ariz., S.W. New Mex., and N. Son. Sts. solitary or clustered, 2-6 in. high. Fls. salmon colored. bbg.

C. sulcolanata Lem.

Spherical, cespitose; apex densely white-woolly. Fls. 3 in. in diam., yellow inside, red outside.

C. vaupeliana Bod.

Mex. Globose or oval, 3 in. broad. Pale bluish green. Fls. large, yellow.

C. vivipara (Nutt.) B. & R.

(**Mammillaria vivipara** Haw.)

Manitoba to Alberta, Kan. to Tex. and Colo. Plants solitary or in clusters, forming mounds, globular with prominent tubercles. Fls. pinkish purple.

DEAMIA

An elongated cactus, clambering over or pendent from rocks or climbing and growing on bark of living trees, the joints usually broadly 3-winged, but sometimes 5-8-ribbed or winged, clinging by aerial roots; fls. diurnal, yellowish white inside; fr. not known.

D. testudo (Karw.) B. & R.

(**Cereus testudo** Karw.)

S. Mex. to Colombia. Sts. and joints various, 1 ½-4 in. broad, or perhaps even more; ribs thin, wing-like, ½-1 ¼ in. high. Fls. 11 in. long.

DOLICHOTHELE

Plant body globose, more or less cespitose, soft in texture, never milky; tubercles elongated, but grooved above; fls. very large, yellow inside; fr. smooth, greenish, purplish, or red, globose, ellipsoid or short-oblong.

D. longimamma (D C.) B. & R.

(*Mammillaria longimamma* D C.)

Cent. Mex. Solitary or cespitose, about 4 in. high. Fls. citron yellow. b.

D. sphaerica (Dietr.) B. & R.

(*Mammillaria sphaerica* Dietr.)

S. Tex. and N. Mex. Low, depressed, growing in large cespitose masses 8 in. in diam. Fls. yellow. bbg.

ECHINOCACTUS

Plants very large, thick, cylindric and many ribbed, or low and several ribbed, the top clothed with a dense mass of wool or nearly naked; fls. usually yellow, rarely pink; fr. densely covered with white wool.

E. fendlerii Ruml.

Tex., N. Mex., Ariz., and No. Mex. Cespitose, 6-10 in. high. Fls. large, purple.

E. gibbosus D C.

(*Gymnocalycium gibbosum* (Haw.) Pfeiff.)

Arg. Plant body simple to 8 in. tall, with 12-14 ribs. Fls. white to pinkish, 2-3 in. long.

E. grusonii Hildm. GOLDEN CACTUS.

Mex. Single, depressed globose, large, 8-52 in. or more often 16-32 in. in diam. Spines yellow. Fls. yellow.

E. horizonthalonius Lem.

W. Tex., S. New Mex. to Ariz., and No. Mex. Simple, globular or sometimes depressed, or short cylindric, 1½-10 in. high. Fls. pale rose to pink.

E. knippelianus Quehl.

(*Frailea knippeliana* B. & R.)

Paraguay. Simple, small, cylindric, 2½ in high, ¾-1 in. in diam. Ribs 15, low, divided into tubercles. Fls. 1 in. long, yellowish.

E. moelleri Haage Jr.

S. W. U. S. Similar to *E. horizonthalonius*, with more slender spines. o.

E. palmeri Rose.

(*E. saltillensis* Hort.)

E. and No. Mex. Sts. 3½-7 ft. high, 16-20 in. in diam. Ribs 12-26, or perhaps more in large plants. Fls. yellow, rather small. Fr. about 1 in. long, hidden in dense covering of soft white wool. w.

E. polycephalus Engelm. & Bigel. NIGGER HEAD.

Nev., Utah, W. Ariz., S. Calif., to N. Son.; reported from L. Calif. Solitary when young; in age forming large clumps of 20-30 heads, sometimes 28 in. high. Fls. yellow.

E. visnaga Hook.

Mex. Very large, 7-10 ft. high. Fls. yellow. o.

ECHINOCEREUS

Plants always low, perennial, erect or prostrate, sometimes pendent over rocks or cliffs, single or cespitose, globular to cylindrical; fls. usually large, but in some species small, diurnal, some not closing at night; scarlet, crimson, purple or rarely yellow.

E. adustus Engelm.

Chihuahua, Mex. 1½-2½ in., simple. m.

E. blanckii (Poselg.) Palmer.

(*Cereus berlandieri* Engelm.)

N.E. Mex. and S. Tex. Procumbent. Fls. purple. o.

E. chloranthus (Engelm.) Ruml.

W. Tex., S.E. New Mex., No. Mex. Cylindric, usually simple, 3-6 in. long; 2-3 in. diam. Fls. yellowish green. w.

E. coccineus Engelm.

N. Mex. and Ariz., Utah and Colo. 8 in. high, densely cespitose. bbg.

E. conoideus (Engelm. & Bigel.) Ruml.

S.E. N. Mex. and W. Tex. Cespitose. m.

E. dasyacanthus Engelm.

W. Tex., S. New Mex. and No. Mex. 4-12 in., usually single. bbg.

E. delatii Gurke.

Mex. Low, 4-8 in., densely cespitose. bbg.

E. dubius (Engelm.) Ruml.

(*Cereus dubius* Engelm.)

S.E. Tex. Somewhat cespitose; sts. 4½-8 in. long. Fls. pale purple. mnh.

E. ehrenbergii (Pfeiff.) Ruml.

(*Cereus ehrenbergii* Pfeiff.)

Cent. Mex. Cespitose; 8 in. high; joints often procumbent. m.

✓ **E. engelmannii** (Parry) Ruml.

Calif., Ariz., Son. and L. Calif. 4-12 in. Cespitose. Common.

E. enneacanthus Engelm.

N. Mex., S. Tex. and N. Mex. Cespitose, joints often prostrate. bbg.

E. fitchii B. & R.

Tex. Short-cylindric or narrowed above, 3-4 in. long. Fls. pink. mnh.

E. maritimus (Jones) Schum.

W. coast of L. Calif. 12 in., densely cespitose. w.

E. merkeri Hildm.

Durango, Coahuila, Mex. Cespitose; joints erect, about 5 in. in diam., light green; ribs 8 or 9. Fls. purple, 2¼ in. long.

E. mohavensis (Engelm. & Bigel.) Ruml.

S.E. Calif. and Ariz. 2-8 in., in massive clumps. m.

E. octacanthus Muhlenpf.

N.W. Tex. Cespitose, with many simple joints; joints 3-4 in. long. Fls. red. w.

E. papillosus Link.

(*E. texensis* Runge.)

W. Tex. More or less cespitose, decumbent or ascending, 2-12 in. long. Fls. yellow with reddish center. o.

E. pectinatus (Scheidw.) Engelm.

Cent. Mex. Simple, erect, cylindric, 4-6 in. long. Fls. purplish.

E. pentalophus (D C.) Ruml.

E. Mex., and S. Tex. Procumbent, with ascending branches. bbg.

E. perbellus B. & R.

Tex. Simple or clustered, 2-4 in. high. Fls. purple. w.

E. polyacanthus Engelm.

(*Cereus polyacanthus* Engelm.)

Mex. to W. N. Mex. and S.E. Ariz. Cespitose, forming clumps of 20-50 sts. Fls. crimson. o.

E. reichenbachii (Tersch.) Haage Jr.

Tex. and N. Mex. 1-8 in., cespitose. bbg.

E. rigidissimus (Engelm.) Rose. RAINBOW CACTUS.

S. E. Ariz. and N. Son. 4-8 in., simple. Fls. rosy pink with white centers. Common.

E. stramineus (Engelm.) Ruml.

Ariz., W. Tex., S. N. Mex. and No. Mex. 1-3 ½ ft., in immense mounds. mnh.

E. triglochidiatus Engelm.

W. Tex., N. Mex. and Colo. Always cespitose, few or many simple sts., 8-24 in. long, 2-3 ¼ in. in diam. Fls. scarlet. w.

ECHINOFOSSULOCACTUS

Mostly rather small plants, rarely over 4 in. in diameter, but generally much smaller, usually solitary, rarely clustered, deep-seated in the ground, globular or depressed, ribs usually numerous, usually very thin, more or less wavy; fls. small; fr. globular to short-oblong.

Echinocactus in dealers' catalogues.

E. coptonogonus (Lem.) Lawr.

Mex. 2 ½-4 in. Fls. purple with white margins. m.

E. crispatus (D C.) Lawr.

Mex. Somewhat depressed Fls. purplish. m.

E. multicostatus (Hildm.) B. & R.

(*Echinocactus multicostatus* Hildm.)

E. Mex. Simple, usually globose, sometimes depressed. 2 ½-4 in. diam. o.

E. tricuspidatus (Scheidw.) B. & R.

San Luis Potosi, Mex. Globose to short cylindric. Ribs numerous, thin, wavy. Upper spines reddish, black tipped. Fls. greenish white. o.

ECHINOMASTUS

Plants small, globular or short-cylindric, ribbed, the ribs low, more or less spiraled, divided into definite tubercles; fls. usually purple; fr. small.

E. erectocentrus (Coulter) B. & R.

(*Echinocactus erectocentrus* Coulter.)

E. Mex. Simple, usually globose, sometimes depressed.

S.E. Ariz. Broadly ovoid to short-cylindric, $3\frac{1}{4}$ - $5\frac{1}{2}$ in. high. Fls. pinkish. o.

E. intertextus (Engelm.) B. & R.

(*Echinocactus intertextus* Engelm.)

S.W. Tex. to S.E. Ariz. and N. Mex. Simple, globular, or nearly so, 1-4 in. in diam. Fls. purplish.

ECHINOPSIS

Sts. usually low, rarely over 12 in. high, usually much shorter, generally globular or short-cylindric, but some species large, columnar, either solitary or clustered, with ribs either continuous or more or less undulate; fls. usually white, rarely yellow or rose-colored; fr. globose to ovoid or sometimes narrowly oblong, splitting open on one side.

E. albiflora K. Schum.

Paraguay. Body spherical, diam. 4 in. Fls. 7-8 in. long, diam. about 6 in. Outer segments bluish green, inner pure white.

E. duvallii Hort.

Origin unknown. Fls. pale rose.

E. eyriesii (Turp.) Zucc.

S. Braz., Uruguay and province of Entre Rios, Arg. Simple or clustered, globular to short-columnar. Fls. white. mnh.

E. forbesii (Lehm.) Walpers.

Paraguay. Usually simple, columnar, sometimes $3\frac{1}{2}$ ft. high, 8 in. in diam. Fls. white.

E. leucantha (Gillies) Walpers.

(*E. campylacantha* Pfeiff.)

W. Arg. Sts. globose to oblong, about 14 in. high. Fls. purplish and white.

E. muelleri Hort.

Hybrid?

E. multiplex (Pfeiff.) Zucc.

S. Braz. Plants simple or very proliferous, globular to somewhat clavate, 6 in. high. Fls. rose colored. Common.

E. oxygona (Link) Zucc.

(*Echinocactus oxygonus* Link.)

S. Braz., Uruguay, and N. E. Arg. Plants sub-globose, simple or somewhat clustered, about 10 in. in diam., somewhat glaucous; ribs 14, broad at base, rounded on back. Fls. sometimes nearly 12 in. long, pale red.

E. x triumphans (Schelle) B. & R.

(*E. oxygona* x *E. eyriesii* Turp.)

Fls. large and showy. b.

E. turbinata Zucc.

Arg. Simple or somewhat clustered. Fls. white. m.

EPIPHYLLUM

Plants mostly epiphytic, the main st. often terete and woody; branches usually much flattened, often thin and leaf-like, sometimes 3-winged; fls. usually large, in some species diurnal, in others nocturnal, either odorless or very fragrant; fr. globular or short-oblong to narrowly oblong, often with low ridges, sometimes tubercled, red or purple, edible or insipid; when mature splitting down one side and exposing the white or crimson pulpy interior.

E. ackermannii Haw.

(*Phyllocactus ackermannii* Salm-Dyck.)

Hybrid. Branches weak, flat and thin with crenate margins. Fls. crimson.

E. anguliger (Don.) B. & R. SWORD FISH.

(*Phyllocactus anguliger* Lem.)

C. and S. Mex. Much branched; sts. and lower branches terete; upper branches flattened, with deeply toothed margins, rather fleshy. Fls. brownish yellow outside, white inside.

E. crenatum (Lindl.) G. Don.

Honduras and Guatemala. Branches often rooting at tips, about 1 in. broad. Fls. cream-colored to greenish yellow. w.

E. darrahii (Schum.) B. & R.

(*Phyllocactus darrahii* Schum.)

Mex. Sts. much branched, often terete and woody below. Fls. lemon yellow in outer part, pure white in inner part.

E. guatemalense B. & R.

(*Phyllocactus guatemalensis* Vaupel.)

Guatemala. Rather stout, in cultivation 3½ ft. long or longer. Fls. red and white. Nocturnal. mnh.

E. oxypetalum (D C.) Haw.

(*Phyllocactus latifrons* Pfeiff.)

Mex., Guatemala, Venezuela and Braz. Plants stout, 10 ft. long or more, much branched, branches flat and thin. Fls. white.

E. stenopetalum (Forst.) B. & R.

(*Phyllocactus stenopetalus* Forst.)

Mex. Fls. inner part white, outer rose-colored. w.

E. strictum (Lem.) B. & R.

(*Phyllocactus strictus* Lem.)

S. Mex. and Guatemala to Panama. To 7 ft. long. Fls. pink and white. mnh.

Note.—The following names of plants of garden origin (Hort.) are used in trade.

E. album var. **superbum** Hort.

(*Phyllocactus albus* var. *superbus* Hort.)

E. blindlii Hort.

(*Phyllocactus blindlii* Hort.)

- E. cooperi** Hort.
(*Phyllocactus cooperi* Hort.)
Hybrid. w.
- E. formosum** Hort.
(*Phyllocactus formosus* Hort.)
w.
- E. German Empress** Hort.
(*Phyllocactus German Empress* Hort.)
Fls. pink.
- E. roseum** var. **superbum** Hort.
(*Phyllocactus roseus* var. *superbus* Hort.)
w.
- E. superbum** Hort.
(*Phyllocactus superbus* Hort.)

EPITHELANTHA

Plant globular, very small, the surface divided into numerous tubercles arranged in spiral rows, mostly hidden by the numerous small spines; fls. very small; fr. small.

- E. micromeris** (Engelm.) Web. **BUTTON CACTUS.**
(*Mammillaria greggii* Saff.)
W. Tex. and No. Mex. Small and low. Fls. very small, whitish to light pink. bbg.

ESCOBARIA

Globose or cylindric, usually cespitose, never milky; tubercles grooved above, persisting as knobs at the base of old plants after the spines have fallen; fls. small; fr. red.

- E. dasyacantha** (Engelm.) B. & R.
W. Tex., S. New Mex., N. Chihuahua. Globose to short-oblong, 1½-3 in. diam., sometimes 8 in. long. Fls. pinkish. bbg.
- E. runyonii** B. & R.
Tex. Numerous globose heads, 1¼-2 in. long. bbg.
- E. sneedii** B. & R.
Tex. Densely cespitose, creeping or spreading. Fls. pink to saffron.
- E. tuberculosa** (Engelm.) B. & R.
S.W. Tex., New Mex. and No. Mex. Cylindric, 2-7 in., in clumps. b.

ESCONTRIA

Large and much branched plants; ribs few. Fls. small, yellow. Fr. globular, purple, fleshy, edible.

- E. chiotilla** (Web.) Rose.
(*Cereus chiotilla* Web.)
Mex. Plant tall, trunk very short, branches numerous, forming a compact top, weak and easily broken, bright green, not at all glaucous; ribs 7-8. Fls. yellow inside. Fr. glabrous, 2 in. in diam., scaly, edible. Rare. o.

FEROCACTUS

Globular to cylindric, often large cacti; ribs thick and prominent; fls. usually large; fr. oblong.

F. acanthodes (Lem.) B. & R. BARREL CACTUS.

(*Echinocactus cylindraceus* Engelm.)

Calif., Nev., and L. Calif. Globose, simple or branching at base, becoming 3 ft. high and 1 ft. in diam. Ribs 13 in younger specimens, 20-27 in older ones. Fls. yellow-orange. Common.

F. covillei B. & R.

(*Echinocactus emoryi* Engelm.)

S. Ariz. and Son. 5 ft., globular to short cylindric. Fls. red tipped with yellow. m.

F. glaucescens (D C.) B. & R. BLUE CACTUS.

(*Echinocactus pfeifferi* Zucc.)

E. and C. Mex. Globular, bluish green. Fls. yellow. Rare. o.

F. hamatacanthus (Muhlenpf.) B. & R.

(*Echinocactus hamatacanthus* Muhlenpf.)

Solitary, globular to oblong, to 1½ ft. high. Ribs usually 13, sometimes 17, strongly tubercled. Fls. large, yellow, in some forms said to be scarlet within. Fr. oblong, edible, dark-brown to drab-colored. w.

F. johnsonii Parry.

N.W. Ariz., E. Calif., Utah and Nev. 4-8 in. oblong. Fls. deep red-pink. bbg.

F. latispinus (Haw.) B. & R.

(*Cactus latispinus* Haw.)

(*Echinocactus cornigerus* D C.)

Mex., reported from Guatemala. Plant simple, globular or somewhat depressed; 10-16 in. high, 16 in. in diam. Ribs 15-23, but usually 21, prominent. Fls. bell-shaped, rose to purple. Fr. elongated, 1½ in. long. w.

F. lecontei (Engelm.) B. & R.

(*Echinocactus lecontei* Engelm.)

S. Calif., N. L. Calif., Son. and E. into Utah and Ariz. Cylindric, to 7½ ft. high or more, rather slender. Spines straw-yellow. Fls. yellow or red. Young plants resemble *F. wislizeni*. mnh.

F. melocactiformis (D C.) B. & R.

(*Echinocactus electracanthus* Lem.)

E. Mex. 1½-2 ft. Fls. yellow.

F. robustus (Link & Otto) B. & R.

Tehuacan, Puebla, Mex. In large clumps, often 9 ft. in diam., 3-4 ft. high, with hundreds of branches; ribs 8. Fls. yellowish.

F. rostii B. & R.

S. Calif. and L. Calif. 10 ft. cylindrical, fls. dark yellow. mnh.

F. stainesii (Hook.) B. & R.

Mex. Simple or proliferous, globular to columnar, to 5 ft. high. Fls. yellow. bbg.

F. uncinatus (Galeotti) B. & R.

W. Tex. to Cent. Mex. Plant short-cylindric, 4-8 in. high. Fls. brownish.

F. viridescens (T. & G.) B. & R.

S. W. Calif. and L. Calif., near coast. 12-18 in., globose to cylindrical. Fls. yellowish green. mnh.

F. wislizeni (Engelm.) B. & R. BARREL CACTUS.

Ariz., S. Tex., N. Mex., No. Mex. Globular to cylindric, 1-7 ft. high. Spines white to red. Fls. yellow or red tipped with yellow. Fr. $\frac{1}{2}$ in. long. o.

GYMNOCALYCIUM

Plants globular, simple or cespitose, strongly ribbed, ribs divided into tubercles often protruding at the base; fls. usually large for size of plant, white, pink, or rarely yellow; fr. oblong, red so far as known.

G. brachyanthum (Gurke) B. & R.

(*Echinocactus brachyanthus* Gurke.)

N. Arg. St. simple, depressed-globose, 2 $\frac{3}{4}$ in. high, 3 $\frac{1}{4}$ in. diam. Fls. white to rose colored.

G. gibbosum (Haw.) Pfeiff.

(*Echinocactus gibbosus* D C.)

Arg. Plants simple, sometimes depressed, but usually taller than thick, sometimes 8 in. high. Fls. white to pinkish.

G. monvillei Pfeiff.

(*Echinocactus monvillei* Lem.)

Paraguay. Globose, large, 8 in. in diam. or more. Fls. nearly white. o.

G. multiflorum (Hook.) B. & R.

(*Echinocactus multiflorus* Hook.)

Reported from Braz., Uruguay, Paraguay, Arg. Simple or cespitose, globular or somewhat depressed or short-columnar, 3 $\frac{1}{2}$ in. high or more, 5 in. in diam. Fls. pinkish to nearly white.

G. platense (Speg.) B. & R.

(*Echinocactus quehlianus* F. Haage.)

Arg. Small, depressed, half hidden in the earth, 1 $\frac{1}{2}$ -3 $\frac{1}{2}$ in. broad. Fls. dull bluish green.

G. schickendantzii (Web.) B. & R.

(*Echinocactus schickendantzii* Web.)

N. Arg. Usually simple, sometimes depressed, up to 4 in. in diam. Fls. white or pinkish in age.

HAMATOCACTUS

Globular to short-cylindric, of flabby texture like an *Echinocereus*, distinctly ribbed, ribs more or less spiraled; fr. small, globular, red.

H. setispinus (Engelm.) B. & R.

S. Tex. and No. Mex. To 6 in. Fls. yellow with red center. bbg.

HARRISIA

Night-flowering cacti with slender, branched sts., the branches fluted or angled; fls. mostly pink or greenish outside, white or pinkish inside.

H. adscendens (Gurke) B. & R.

(*Cereus adscendens* Gurke.)

Braz. First erect, becoming much branched and bushy, or with long clambering branches, 17-27 ft. long. Fls. white. Nocturnal. m.

H. bonplandii (Parmentier) B. & R.

Paraguay, Arg. and Braz. Sts. slender and weak, at first erect, up to 10 ft. high or more, sometimes procumbent or arching. Fls. white, nocturnal. w.

H. guelichii (Speg.) B. & R.

Arg. Branching, high climbing on trees, up to 10 ft. Fls. green. Nocturnal.

H. martinii (Labouret) B. & R.

Arg. Much branched, clambering, 6½ ft. long or longer. Fls. white or tinged with pink. Nocturnal. m.

H. tortuosa (Forbes) B. & R.

(*Cereus tortuosus* Forbes.)

Arg. At first erect, soon branching. Fls. white to pink. Nocturnal.

HATIORA

Unarmed, slender, branched; branches terete, short, smooth, leafless and spineless.

H. salicornioides (Haw.) B. & R.

(*Rhipsalis salicornioides* Haw.)

S. Braz. 3½-7 ft. long, much branched. Erect or climbing. Fls. yellow. w.

HELIOCEREUS

Sts. usually weak, procumbent or climbing over rocks and bushes, in cultivation often bushy and erect; branches strongly angled or ribbed; ribs or angles usually 3 or 4, sometimes up to 7; fls. diurnal, usually scarlet, sometimes white.

H. schrankii (Zucc.) B. & R.

(*Cereus schrankii* Zucc.)

Zimipan. Mex. Sts. ascending, branching; joints ½-¾ in. broad, 3 or 4-angled, somewhat winged, when young reddish, in age green; fls. dark red, large, 5½ in. broad.

H. speciosus (Cavanilles) B. & R.

(*Cereus speciosus* Schum.)

Cent. Mex. and reported from Cent. Amer. Sts. clambering or hanging. Fls. scarlet. mnh.

HICKENIA

Small, usually globular, very spiny cacti; ribs more or less definite, sometimes spiraled, divided into low, rounded tubercles; fls. large for size of plant; fr. small, oblong.

H. microsperma (Web.) B. & R.

(*Echinocactus microspermus* Web.)

N. Arg. Simple or in small clusters, usually globular, somewhat short-cylindric and 8 in. high, 2-4 in. in diam. Fls. bright yellow to red.

HOMALOCEPHALA

Low, depressed or subglobose plants, strongly ribbed; fls. day-blooming; fr. globular, scarlet, bursting irregularly.

H. texensis (Hopff.) B. & R.

(*Echinocactus texensis* Hopff.)

S.E. N. Mex., Tex., No. Mex. Usually simple, generally much depressed, 12 in. broad, 4-6 in. high. Fls. scarlet and orange below, pink to white above.

HYLOCEREUS

Climbing cacti, often epiphytic, with elongated sts. normally 3-angled or 3-winged, and branches emitting aerial roots; fls. mostly white, rarely red; fr. mostly large and edible.

H. guatemalensis (Eichlam) B. & R.

(*Cereus trigonus* var. *guatemalensis* Eichlam.)

Guatemala. High-climbing, 10-17 ft. long, stout. Fls. rose colored and white. Nocturnal. mnh.

H. napoleonis (Graham) B. & R.

(*Cereus napoleonis* Graham.)

W. Indies and S. Mex. Sts. much branched, light green, the joints with 3 acute angles and concave sides; angles tuberculate, not at all horny. Fls. 8 in. long and nearly as broad, yellow outside, pure white inside.

H. ocamponis (Salm-Dyck) B. & R.

(*Cereus ocamponis* Salm-Dyck.)

Mex. Sts. strongly 3-angled, at first bright green, soon glaucous, dull bluish green in age. Ribs rather deeply undulate, their margins with a horny, brown border. Fls. 10-12 in. long, and fully as broad, greenish outside, white inside.

H. triangularis (Linn.) B. & R.

Jamaica. High-clambering or creeping vines. Fls. white. Nocturnal. mnh.

H. trigonus (Haw.) B. & R.

(*Cereus trigonus* Haw.)

West Indies. Sts. slender, about 1 in. broad, clambering over bushes or rocks, sometimes 34 ft. long, deep green; joints 3-angled, the margin of the ribs not horny; fr. oblong, red, 4 in. long.

H. undatus (Haw.) B. & R.

(*Cereus undatus* Haw.)

Tropics and subtropics. Sts. long, clambering or creeping. Fls. yellowish green and white. Nocturnal. Fr. edible. mnh.

LEMAIREOCEREUS

Plants usually large, tall and branching, but rarely low, nearly prostrate, simple, forming thickets; fls. diurnal or in some species nocturnal; fr. globular to oval, often edible, irregularly bursting when old.

L. beneckeii Ehrenb.

(*Cereus beneckeii* Ehrenb.)

Mex. Plant 12-16 ft. high, much branched. Ribs 7 or 8, strongly tuberculate. Fls. night-blooming, remaining open until noon, longer on cloudy days. Small, 5½ in. long, greenish brown without, rose-colored to white within. Fr. red. o.

L. dumortieri (Scheidw.) B. & R.

(*Cereus dumortieri* Scheidw.)

C. Mex. Often tree-like, tall, the trunk proper short, woody; branches many, erect with numerous constrictions, very pale bluish green or somewhat glaucous; ribs generally 6, sometimes 5 or 7, occasionally 9 on very old joints. Fls. 2 in long. Fr. oblong, small, 1-1½ in. long, reddish within, spineless.

L. eichlamii B. & R.

(*Cereus laevigatus* var. *guatemalensis* Eichlam.)

Guatemala. Cylindrical, simple. Fls. purple. mnh.

L. hiptrix (Haw.) B. & R.

Dry parts of W. Indies. Often 25-40 ft. high, with erect branches. Trunk short. Spines gray. Fls. white. w.

L. hollianus (Web.) B. & R.

(*Cereus hollianus* Web.)

Puebla, Mex. St. simple or branching only at base, 13-17 ft. high. Ribs 8-12. Fls. 4 in. long. Fr. "as large as a goose egg," dark purple to red.

L. longispinus B. & R.

Guatemala. Erect, rather stout. w.

L. queretaroensis (Web.) Saff.

(*Cereus queretaroensis* Web.)

C. Mex. Plant 10-16 ft. high, with a short woody trunk, much branched above; ribs 6-8, prominent, obtuse. Fls. 1¼-2¾ in. long. Fr. spiny, edible.

L. stellatus (Pfeiff.) B. & R.

S. Mex. 7-10 ft. high, branching at base. Fls. red. Fr. edible. w.

L. thurberi (Engelm.) B. & R.

(*Cereus thurberi* Engelm.)

S. Ariz., Son., coasts of L. Calif. Without definite trunk,

branching from base, 10-23 ft. high. Fls. light purple with white margins. Fr. edible.

L. weberi (Coulter) B. & R.

(*Cereus weberi* Coulter.)

Puebla and Oaxaca, Mex. Plant very large, 33 ft. or more high, with a trunk short but thick and often with hundreds of nearly erect branches arising from near the base, dark bluish green, slightly glaucous. Ribs usually 10, rounded. Fls. $\frac{3}{4}$ in. long. Fr. oblong, edible, $2\frac{1}{2}$ -3 in. long.

LOBIVIA

Plant globular to short-cylindric, either simple or in clusters, always ribbed, usually very spiny; fls. so far as known diurnal; red in typical species, but in others yellow or white; fr. small, globular.

L. caespitosa (Purpus) B. & R.

(*Echinopsis caespitosa* Purpus.)

Bolivia. At first simple, but becoming densely caespitose. Fls. red.

L. pentlandii (Hook.) B. & R.

Bolivia. Simple, higher than broad. m.

LOPHOCEREUS

Columnar, stout cacti, the sts. simple or with few branches, or much branched at base; ribs few; fls. nocturnal, beginning to open at about six o'clock at night and by eight or nine fully expanded, but closed the following morning, odorless; greenish outside and pink inside; fr. small, red, globular, when mature bursting irregularly.

L. schottii (Engelm.) B. & R.

S. Ariz., Son., L. Calif. Columnar, stout, $3\frac{1}{2}$ -23 ft. high, usually branching at base. Fls. pink. w.

LOPHOPHORA

Plant small, simple, or proliferous, spineless, very succulent; ribs very broad and rounded, bearing a few low tubercles; fls. white to rose-tinted; fr. red to pinkish.

L. williamsii (Lem.) Coulter. MESCAL BUTTON.

(*Anhalonium williamsii* Engelm.)

S. Tex. and Cent. Mex. Low, top-shaped. Fls. pale pinkish white. bbg.

MACHÆROCEREUS

Plants prostrate or low and bushy, often with long horizontal or prostrate stout branches, very spiny throughout; ribs low; fls. diurnal; fr. globular, edible when young.

M. eruca (Brand.) B. & R.

(*Cereus eruca* Brand.)

L. Calif. Prostrate, except erect or ascending tips; branches 3½-10 ft. long. Fls. lavender. m.

M. gummosus (Engelm.) B. & R.

L. Calif. and adj. isls. Erect, but usually not 3½ ft. high, or with long spreading branches. Fls. purple. bbg.

MALACOCARPUS

Plants globose to short-cylindric, either simple or clustered; ribs definite, usually straight, either entire or broken up into more or less definite tubercles; fls. mostly yellow; fr. soft, rose-red or crimson.

M. concinnus (Monv.) B. & R.

(*Echinocactus concinnus* Monv.)

S. Braz. and Uruguay. Simple, globular or somewhat depressed; 2-3 in. in diam. Fls. reddish.

M. erinaceus (Haw.) Ruml.

(*Echinocactus corynodes* Otto.)

S. Braz. and adj. parts of Arg. and Uruguay. Simple, globular to short cylindric, 6 in. high. Fls. yellow.

M. leninghausii (Haage Jr.) B. & R.

(*Echinocactus leninghausii* Schum.)

S. Braz. Sts. slender, cylindric, sometimes 3½ ft. long, 4 in. in diam. Fls. citron yellow.

M. maassii (Heese) B. & R.

(*Echinocactus maassii* Heese.)

S. Bolivia and N. Arg. Globular to short cylindric, 4-6 in. in diam. Fls. orange-red.

M. mammillarioides (Hook.) B. & R.

(*Echinocactus centeterius* Lehm.)

Chile. Sub-globose to short-cylindric. Fls. yellowish red.

M. mammulosus (Lem.) B. & R.

(*Echinocactus submammulosus* Lem.)

(*Echinocactus pampeanus* Speg.)

Braz., Uruguay, Arg. Simple, nearly globose, 3¼ in. high. Fls. yellow.

M. tabularis (Cels.) B. & R.

(*Echinocactus tabularis* Cels.)

Braz. and Uruguay. Simple, globose or short columnar. Fls. yellow.

M. tabularis var. cristatus Rebut.

Braz. or Uruguay. Fls. yellow. w.

MYRTILLOCACTUS

Tree-like, with a short definite trunk crowned by a large, much-branched top; branches often a little curved, bluish green, usually 5- or 6-ribbed, very blue when young; fr. ellipsoid to sub-globose, edible, purplish or bluish.

M. cochal (Orcutt) B. & R.

(*Cereus cochal* Orcutt.)

L. Calif. 3½-10 ft. high, much branched. Fls. light green, tinged with purple, open day and night. Fr. edible. m.

M. geometrizans (Mart.) Console.

Mex. Tree-like, with a short, definite trunk crowned by a large, much-branched top. Fr. edible. mnh.

M. schenckii (Purpus) B. & R.

(*Cereus schenckii* J. A. Purpus.)

Puebla, Oaxaca, Mex. Tree-like, 10-17 ft. high, with a very stout trunk and many short ascending branches, dark-green; areoles circular, crowded with black felt; very similar to *M. geometrizans*, but differs in the colors of the sts. and in the areoles and spines.

NEOBESSEYA

Simple or tufted cacti, globose or somewhat depressed; tubercles irregular or somewhat spiraled, most of them grooved on the upper side; fls. large, yellow or pink, probably always day-blooming; fr. globose, bright red.

N. wismannii (Hildm.) B. & R.

(*Mammillaria wismannii* Hildm.)

Cent. Tex. Solitary or forming mounds with 25 heads or more. Fls. dark yellow.

NEOMAMMILLARIA

Plants globose, depressed-globose, or short-cylindric, occasionally much elongated, some with milky, others with watery juice; tubercles arranged in more or less spiraled rows, never on vertical ribs, terete, angled or sometimes flattened, never grooved on upper surface; fls. diurnal, small, variously colored, commonly red, yellowish or white to pinkish; fr. ripening rapidly, scarlet or white or greenish in a few species.

N. albicans B. & R.

Santa Cruz Isl., Gulf of Calif. Plants becoming cylindric, often in clumps; old plants up to 8 in. long; white spines almost hiding body.

N. applanata (Engelm.) B. & R.

Cent. and S. Tex. Much flattened. mnh.

N. camptotricha Dams. B. & R.

(*Mammillaria camptotricha* Dams.)

Mex. Cespitose, globose. Tubercles elongated, bearing bristles in axils. Fls. small, greenish white without, white within. o.

N. candida (Scheidw.) B. & R.

(*Mammillaria candida* Scheidw.)

C. Mex. Cespitose and globose. Almost hidden by white spines. Fls. rosy. Fr. red.

N. chionocephala Purpus.

Coahuila, Mex. Globose, sometimes 12 in. in diam., almost hidden by white spines. Tubercles milky. Fls. $1\frac{1}{2}$ in. long, rose-red. Fr. red. w.

N. compressa (D C.) B. & R.

(*Mammillaria angularis* Link. & Otto.)

(*Mammillaria angularis* var. *longiseta* Muhlenpf.)

Mex. Cylindric, in large clumps. b.

N. dealbata (Dietr.) B. & R.

Mex. Globose. m.

N. denudata (Engelm.) B. & R.

W. Tex. and Mex. Globose, $1-1\frac{1}{2}$ in. in diam. Fls. white and light purple. mnh.

N. dioica (K. Brand.) B. & R.

S.W. Calif. and L. Calif. Cylindrical, solitary or cespitose, 2-10 in. bbg.

N. elegans (D C.) B. & R.

(*Mammillaria elegans* D C.)

C. Mex. Simple; tubercles not milky. Spines bristly white and spreading. o.

N. elongata (D C.) B. & R. STAR OR LACE CACTUS.

Mex. Cespitose, 1-4 in. mnh.

N. fasciculata (Engelm.) B. & R.

(*Mammillaria fasciculata* Engelm.)

S. Ariz. Forming clumps containing as many as 110 plants, usually 2-3 in. high. Fls. purplish. o.

N. galeottii (Scheidw.) B. & R.

(*Mammillaria galeottii* Scheidw.)

Mex. Solitary or cespitose. Globose. Spines elongated. Fls. pale rose to crimson. o.

N. geminispina (Haw.) B. & R. SNOW CACTUS.

(*Mammillaria nivea* Wendl.)

(*Mammillaria nobilis* Pfeiff.)

N. Cent. Mex. Cespitose, or single in cultivation, cylindric. Fls. dark red.

N. goodridgei (Scheer) B. & R.

(*Mammillaria goodridgei* Scheer.)

Cedros Isl. and adj. L. Calif. Sts. clustered, erect, to 4 in. long. Fls. rose-colored. o.

N. hahniana Werdermann.

(*Mammillaria hahniana* Werdermann.)

Mex. Cespitose; axils of tubercles with long, white hairs. Height 3-4 in., by about 4 in. in diam. Recently discovered.

N. hemisphaerica Engelm.

(*Mammillaria heyderi* var. *hemisphaerica* Engelm.)

Tex. and Mex. Deep-seated in soil, hemispheric, 3-5 in. broad, dark green. Tubercles only slightly angled. Fls. small, cream-colored, $\frac{1}{2}$ in. long. Fr. slender, red, $\frac{1}{2}$ in. long. w.

- N. heyderi** (Muhlenpf.) B. & R.
(Mammillaria heyderi Muhlenpf.)
 Tex. and Mex. Globose or somewhat flattened at apex.
 Tubercles conic. Fls. pinkish. Fr. oblong, red. w.
- N. klissingiana** Bod.
 Mex. Globose when young, up to $6\frac{1}{2}$ in. high by
 $3\frac{1}{2}$ in broad, entirely enveloped in white spines. Fls. long,
 tips of petals pointed, rose.
- N. kunzeana** (Bod. & Quehl) B. & R.
(Mammillaria kunzeana Bod. & Quehl)
 Cespitose, globose or sometimes becoming cylindric. Fls.
 white or yellowish white.
- N. lasiacantha** (Engelm.) B. & R.
(Mammillaria lasiacantha Engelm.)
 W. Tex., N. Chihuahua. Globose, $\frac{3}{4}$ -1 in. in diam. Fls.
 whitish or pink. w.
- N. lenta** (K. Brand.) B. & R.
(Mammillaria lenta K. Brand.)
 Coahuila, Mex. Cespitose; globose to short-cylindric, al-
 most hidden by white delicate spines. Tubercles very
 slender, light green. Fls. whitish. Fr. red. w.
- N. macdougalii** (Rose) B. & R.
 S.E. Ariz. Low and flattened or globular. mnh.
- N. microcarpa** (Engelm.) B. & R.
(Mammillaria grahamii Engelm.)
 Tex., Ariz. and Sonora. Cylindric, in small clusters. $3\frac{1}{4}$
 in. b.
- N. moelleriana** Bod.
 Mex. Simple, globose, 3 in. broad, shining green. Fls.
 $\frac{1}{2}$ in. long, from bright rose to brownish without, bright
 rose within. o.
- N. parkinsonii** (Ehrenb.) B. & R.
 C. Mex. Cespitose; 6 in. high. Fls. small, yellowish, sur-
 rounded by a mass of wool.
- N. perbella** (Hildm.)
(Mammillaria perbella Hildm.)
 Mex. Solitary or somewhat cespitose, glaucous-green.
 Spines white. Fls. reddish. w.
- N. pettersonii** (Hildm.) B. & R.
 Mex. Simple, glaucous or ashy green; radial spines 10-14,
 white or tipped brown. Fr. small, naked, oblong.
- N. plumosa** (Web.) B. & R.
(Mammillaria plumosa Web.)
 No. Mex. Small, growing in dense clusters sometimes 6 in.
 broad, entirely covered by the mass of white spines; tuber-
 cles small, somewhat woolly in their axils. Fls. white,
 small.
- N. prolifera** (Mill.) B. & R.
(Mammillaria pusilla Sweet.)
 Cuba and Hispaniola. Low, growing in colonies often 24
 in. in diam. Fls. pale yellow. o.

- N. pseudoperbella** (Quehl) B. & R.
Mex. Globose, solitary or few. c.
- N. rhodantha** (Link & Otto) B. & R.
(*Mammillaria crassispina* Pfeiff.)
(*Mammillaria pfeifferi* Booth.)
(*Mammillaria rhodantha* Link & Otto.)
Probably Cent. Mex. Cylindric, 4-12 in. long, erect. Fls. rose colored. w.
- N. ruestii** (Quehl) B. & R.
Honduras and Guatemala. Cylindric, 2½-3 in. mnh.
- N. sartorii** (Purpus) B. & R.
(*Mammillaria sartorii* Purpus.)
Mts. of Vera Cruz, Mex. Globose, cespitose, bluish green. Tubercles strongly 4-angled. Fls. deep carmine. Fr. deep carmine. o.
- N. spinosissima** (Lem.) B. & R.
(*Mammillaria spinosissima* Lem.)
Mts. of Cent. Mex. Cylindric, 3-12 in. long, 1-4 in. in diam. Fls. purplish.
- N. tetracantha** (Salm-Dyck) B. & R.
(*Mammillaria dolichocentra* Lem.)
Mex. Nearly globular. Axils with scanty wool. Fls. small, pinkish to rose color. o.
- N. waltherii** Bod.
Mex. Simple, globose. 3½ in. broad, dark green. Fls. 6 in. long; whitish. o.
- N. wilcoxi** (Toumey) B. & R.
S. E. Ariz. Solitary, almost globose, 4 in. in diam. Fls. pink to purple. mnh.
- N. woburnensis** (Scheer) B. & R.
(*Mammillaria woburnensis* Scheer.)
Guatemala. Growing in clumps, globose to cylindric. Fls. yellow. w.
- N. zeyeriana** Haage Jr.
(*Mammillaria zeyeriana* Haage Jr.)
Probably Mex. Simple, hemispheric to short-cylindric, to 4 in. high, pale glaucous green. Tubercles in 13 or 21 spirals. Fls. and fr. unknown. w.

NEOPORTERIA

Plants globose to cylindric, sometimes much elongated and then sprawling or pendent over cliffs; ribs usually straight, more or less tubercled; fls. pinkish or reddish; fr. small, more or less globular.

- N. fusca** (Muhlenpf.) B. & R.
(*Echinocactus ebenacanthus* Monv.)
Andes of Chile. Globular to short-cylindric, about 4 in. in diam. Fls. pale yellow, nearly white.

NOPALEA

Much branched cacti with definite cylindric trunks; lvs. small; fls. red or pinkish; fr. juicy, edible. Distinguished from *Opuntia* by protruding stamens.

N. auberi (Pfeiff.) Salm-Dyck.

(*Opuntia auberi* Pfeiff.)

Cent. and S. Mex. 27-33 ft. high with cylindric, jointed trunk. Fls. rose-pink. m.

N. cochinellifera (Linn.) Salm-Dyck.

? Extensively cultivated in trop. Amer. and W. Indies. Often tall, 9-12 ft. Fls. usually numerous appearing from tops of joints, scarlet; fr. red. One of species of cactus from which cochineal was obtained. Cochineal insects fed on cactus were collected two or three times a year and dried. m.

N. dejecta Salm-Dyck.

Panama? 3-6 ft., with a definite trunk, very branching. Common.

N. gaumeri B. & R.

Yucatan. To 10 ft. high, much branched; joints 3-5 in. long; spines 4-12, $\frac{1}{4}$ -1 in. long.

N. inaperta Schott.

Yucatan. To 10 ft. high, much branched; joints 3-5 in. long; spines 4-12, $\frac{1}{4}$ -1 in. long.

N. karwinskiana (Salm-Dyck) Schum.

Mex. Tree, 6-7 ft. high, with a definite trunk. Spines porrect, pale. Fls. red. w.

NYCTOCEREUS

Erect or clambering, slender, sparingly branched cacti, with cylindric, ribbed sts. and branches; ribs numerous, low; fls. large white, nocturnal; fr. fleshy.

N. guatemalensis B. & R.

Guatemala. Sts. half erect, arching, creeping, or prostrate, 3 $\frac{1}{2}$ ft. long. Fls. nearly white. Nocturnal. w.

N. serpentinus (Lag. & Rodr.) B. & R.

Mex. Sts. growing in a cluster, at first erect, then clambering, creeping or hanging. Fls. white. Nocturnal. mnh.

OBREGONIA

Monotypic genus, low-growing, globose cactus with prominent triangular tubercles.

O. denegrii Fric.

Mex. Flat topped, gray or dark green, 3-5 in. broad. Tubercles triangular. Fls. white. o.

OPUNTIA

Sometimes with definite trunks, or more often much branched from base, the branches often spreading, reclining, or prostrate, sometimes clambering, but never climbing; lvs. usually small; fls. usually various shades and combinations of green, yellow and red, rarely white; fr. a berry, dry or juicy, often edible.

Note:—The numerous so-called spineless cacti developed by Luther Burbank, resulted from careful selection of *Opuntia* seedlings, from species bearing few spines. Trade names have been given to a large number of these hybrids, which are not listed nor described here.

O. acanthocarpa Engelm. & Bigel.

Ariz., Calif. Much branched, 5-7 ft. high. Fls. red to yellow. bbg.

O. affinis Griffiths.

Mex. Low, treelike, 4-6 ft. high. Joints downy. Spines 3-5 on upper areoles, straw-colored to white. Fls. orange-red.

O. alcahes Web.

L. Calif. 3 ft. high or less. Joints cylindrical, with broad, low tubercles. Spines sheathed, white. Fls. greenish-yellow.

O. amyclæa Tenore.

Mex. Closely related to the common *O. megacantha*, but differing in presence of small reflexed bristles at areoles. Joints oblong. Spines subulate, spreading.

O. angustata Engelm.

S. W. U. S. Ascending to erect; joints narrow; 6-10 in. long. w.

O. arbuscula Engelm.

Ariz. and Son. 6-10 ft. high. Joints $\frac{1}{2}$ - $\frac{1}{2}$ in., cylindrical, slender. Spines sheathed, solitary. Tubercles slightly raised. Fls. greenish-yellow.

O. aurantiaca Lindl.

Arg. and Urug. Low, much branched, and spreading. mnh.

O. basilaris Engelm. & Bigel. BEAVER TAIL; BULL'S TONGUE.

S. Calif., Ariz. and N. Mex. Low, either prostrate or erect. Fls. deep purple, or sometimes white. Common.

O. basilaris var. albiflora Alverson.

N. Son., W. Ariz., S. Calif., Nev. and S. Utah. Sts. low, growing in clumps, either prostrate or erect, sometimes 4 ft. high.

O. bigelovii Engelm.

S. Calif., Ariz., N. Son. and N. L. Calif. Usually with central trunk to $3\frac{1}{2}$ ft. Fls. pale magenta to crimson. Common.

O. brasiliensis (Willd.) Haw.

S. Braz., Arg. With a cylindrical woody trunk to 12 ft. Fls. yellow. b.



A wall fittingly separates a hillside garden from this planting of bristling opuntias and spike-tipped agaves



OBERT PHOTO

A fine example of the use of desert planting in connection with Californian architecture. The plants and their shadows forms a charming composition

- O. bulbispina** Engelm.
Coahuila, Mex. Low, forming wide-spreading clumps; joints ovoid; tubercles prominent. Fl. and fr. unknown.
- O. cantabrigiensis** Lynch.
Mex. Very close to *O. lindheimeri*, differing in having spines yellow or whitish.
- O. chlorotica** Engelm. & Bigel. CLOCK FACE; DOLLAR CACTUS.
Calif., N. Mex. and N. Son. and L. Calif. Erect, bushy, with a definite trunk to 6 ft. or more. Fls. yellow.
- O. clavarioides** var. *cristata* Pfeiff.
Chile and Mex. Low, much branched, grayish brown, 16 in. high, cristate at apex. Fls. reddish.
- O. clavata** Engelm.
N. Mex., chiefly in the central part of the state. Plants low, much branched at base, spreading, forming large patches. Fls. yellow.
- O. covillei** B. & R.
Int. valleys of S. Calif. Bushy plants. Fls. yellow. mnh.
- O. crassa** Haw.
Unknown in wild state; cultivated in Trop. Amer. Plant 3½-7 ft. high, somewhat branched.
- O. curassavica** (Linn.) Mill.
Curacao. Sts. low, five-jointed, light green; joints oval to oblong; areoles bearing short wool and white cobwebby hairs.
- O. cylindrica** (Lem.) D C.
Ecuador and Peru. Branched, 10-12 ft. Fls. scarlet. Common.
- O. decumbens** Salm-Dyck.
Guatemala and Mex. Sts. low, often creeping or trailing, rarely over 16 in. high. Fls. dark yellow. w.
- O. dillenii** Haw.
W. Indies to S. Carolina. Plant 3-6 ft. high; joints pale green, wavy margined, spines yellow. Fls. large, bright yellow.
- O. discata** Griff.
S. Ariz. and N. Son. Plants bushy, spreading, sometimes 5 ft. high; joints thick, 10 in. in diam. or less, pale bluish green. Fls. large, light yellow, darker near the center. Fr. magenta.
- O. discolor** Sp. nov.
Arg. Low plant forming small dense clumps. Fls. light yellow to orange yellow.
- O. drummondii** Grah.
(*O. pes-corvi* Le Conte.)
Fla. to Carol. Habit low, decumbent; joints dark green; spines usually few. Fls. yellow, about 2 in. in diam. mnh.
- O. echinocarpa** Engelm. & Bigel.
Calif., Ariz., L. Calif. Usually low, but sometimes 5 ft.; much branched and widely spreading. Fls. yellowish. Common.

- O. elata** Link & Otto.
Paraguay. Joints large, 2-10 in. long, oblong. Areoles dark-spotted, remote, large, white-felted. Spines solitary or lacking. Fls. orange-yellow. Fr. unarmed.
- O. engelmannii** Salm-Dyck.
Chihuahua, Durango, Son., Ariz., New Mex., Tex. Widely spreading bush, usually without definite trunk. Fls. yellow. bbg.
- O. erinacea** Engelm.
(**O. ursina** Web.)
Ariz., Utah, Nev. and E. Calif. Grows in small low clumps, ascending or erect, to 2 ft. high, branched. Areoles with white wool, and numerous yellow bristles. Spines reddish white, very slender and bristle-like, sometimes 4 in. long, frequently almost hiding the epidermis of the plant. Fls. red or yellow. Common.
- O. erinacea var. ursina** Engelm. GRIZZLY BEAR.
Mohave Desert. Slender form with long, weak spines. mnh.
- O. ficus-indica** (Linn.) Mill.
? Large and bushy, sometimes erect, with a woody trunk. Fls. bright yellow. Fruit edible. Common.
- O. fragilis** (Nutt.) Haw.
(**O. brachyarthra** Engelm. & Bigel.)
W. U. S. Low and creeping. Joints readily detached, rarely globular, dark green, very spiny. Fls. pale yellow. Fr. dry.
- O. fulgida** Engelm.
S. Ariz., Son., and Sinaloa. Plant sometimes 10 ft. high or more, with definite woody trunk, much branched. Fls. light rose. bbg.
- O. fuscaulis** Griffiths.
Known only in cultivation. To 15 ft. high. Joints gray, spineless, oblong.
- O. glomerata** Haw.
(**O. papyracantha** Philippi.)
W. Arg. Low, spreading clumps. Fls. light yellow.
- O. guatemalensis** B. & R.
Guatemala. Low, spreading. Fls. lemon-yellow. mnh.
- O. imbricata** (Haw.) D C.
(**O. arborescens** Engelm.)
Cent. Colo. to Tex., N. Mex. and Cent. Mex. Tree-like, often 10 ft. high or higher, with woody trunk 1 in. in diam. Fls. purple.
- O. inaequilateralis** Berg.
Known only in cultivation. Belonging to the same group as the well known *O. megacantha*, from which it differs in the obliquely oblong joints that are more or less shining.
- O. kleiniae** D C.
Tex., Cent. Mex. Much-branched, to 7 ft. Fls. purplish. mnh.

- O. laevis** Coulter.
Ariz. Recognizable by the joints having only a few short, stout, yellow spines, or sometimes spineless. Fls. yellow.
- O. lanceolata** Haw.
(**O. elongata** Haw.)
S. Amer.? Mex.? 6-9 ft. Fls. bright yellow. w.
- O. leptocarpa** Mackensen.
Tex. Low, bushy habit. Fls. yellow. w.
- O. leptocaulis** D C.
S.W. U. S. and Mex. Bushy, to 6 ft. Fls. greenish or yellowish. mnh.
- O. leptocaulis var. brevispina** Engelm.
Similar to the type, differing in having much shorter spines and more numerous branches.
- O. leucotricha** D C.
Cent. Mex. 10-15 ft. Fls. yellow. Fr. edible. Common.
- O. lindheimeri** Engelm.
S.W. La., E. Tex., and N.E. Mex. Usually erect, with a trunk, 6-12 ft. Fls. yellow to dark red. bbg.
- O. linguiformis** Griffiths.
S. Tex. Bushy, 3 ft. or more. Fls. yellow. mnh.
- O. littoralis** (Engelm.) Cocker.
Coast of S. Calif. Bushy, low and spreading. Fls. yellow. mnh.
- O. littoralis var. cristata** Hort.
Marked by the joints being much enlarged and conspicuously contorted.
- O. macrocentra** Engelm.
Tex., Ariz. and Mex. 2-3 ft. high. Joints often purplish, spineless or having spines only at the uppermost areoles. Fls. yellow.
- O. maxima** Mill.
(**O. decumana** Willd.)
S. Amer. 10 ft. or more high. Joints spineless, elongated, scarcely tuberculate, dark green. Fls. orange-red.
- O. megacantha** Salm-Dyck.
Mex. 12-20 ft., with woody trunk. Fls. yellow to orange. Common.
- O. microdasys** (Lehm.) Pfeiff.
No. Mex. Low and creeping, or nearly erect, to 20 ft. Fls. yellow or tinged with red. Common.
- O. microdasys var. minima** Hort.
No. Mex. Similar to *O. microdasys*, but joints swollen.
- O. molesta** Brand.
L. Calif. 3-6 ft. high. Branches few. Joints clavate. Tubercles prominent, scarcely compressed. Fls. purple.
- O. moniliformis** (Linn.) Haw.
(**O. haitiensis** Britton.)
Hispaniola; Desecheo Isls., Porto Rico. Trunk flattened above, 10-14 ft. high, branching at top. Fls. yellow to orange. w.

- O. occidentalis** Engelm. & Bigel.
S.W. Calif and N. L. Calif. and adj. isls. Erect or spreading, often 3 ½ ft. high or more, forming large thickets. Fls. yellow. mnh.
- O. opuntia** (Linn.) Karsten.
(**O. rafinesquei** Engelm.)
Mass., Va., and E. Mo. Low, spreading, often spineless. Fls. bright yellow. mnh.
- O. parishii** Orcutt.
S. Calif. and Nev. Sts. low, creeping, rooting along under surface and forming dense, broad clusters. o.
- O. parryi** Engelm.
Int. valleys of S. Calif. Low and bush like. Fls. yellow. mnh.
- O. phaeacantha** Engelm.
Tex., Ariz., and N. Mex. Low, usually prostrate. Fls. yellow. bbg.
- O. polyacantha** Haw.
(**O. missouriensis** D C.)
B. C. and Wash., Tex. and Ariz. Low, joints almost round. Fls. lemon yellow. w.
- O. polyacantha var. albispina** Engelm. & Bigel.
Like the type, but spines white.
- O. pottsii** Salm-Dyck.
C. Chihuahua, Mex. to Tex. and N. Mex. Low, spreading plant. Fls. deep purple. w.
- O. prolifera** Engelm.
S. Calif. and L. Calif., 3-6 ft. Fls. red. mnh.
- O. ramosissima** Engelm.
E. Calif., Ariz., Son. and L. Calif. Bushy, to 6 ft. Fls. yellowish. Fr. scarlet. mnh.
- O. retrorsa** Speg.
Arg. Trailing. Joints elongated, thick, dark green, with purple spots below areoles, and solitary, reflexed, weak spines. Fls. yellowish.
- O. robusta** Wendl.
Cent. Mex. Often erect to 16 ft., much branched. Fls. yellow. m.
- O. rubescens** Salm.
W. Indies. Similar to *O. moniliformis*, but joints tinged reddish-purple.
- O. rufida** Engelm.
No. Mex., Tex. Erect, spineless. Fls. yellow to orange. w.
- O. salmiana** Parment.
S. Braz., Arg. Bushy, much branched, to 7 ft. Fls. pale yellow to white. b.
- O. santa rita** (Griff. & Hare) Rose.
S.E. Ariz. Compact to 5 ft. Fls. deep yellow. mnh.
- O. scheeri** Web.
Mex. 4 ft. Joints thickly set with clusters of short brown bristles. Fls. sulphur yellow. w.

- O. schottii** Engelm.
W. Tex. and N. Mex. Prostrate, forming dense clusters.
Fls. yellow. bbg.
- O. serpentina** Engelm.
S. Calif. and N. L. Calif. Ascending, erect or prostrate;
branches slender. Fls. greenish yellow tinged with red. w.
- O. setispina** Engelm.
Chihuahua, Mex. 2 ft. tall or less. Joints orbicular, deep
bluish green. Spines slender, white, almost 1 in. long.
Fls. yellow.
- O. sphaerocarpa** Engelm. & Bigel.
Albuquerque, N. Mex. Small spreading plants; joints or-
bicular, 2½-3 in. long. w.
- O. spinosior** (Engelm.) Toum.
Ariz., W. N. Mex. and No. Mex. Tree-like, openly branched,
to 12 ft. Fls. purple to pink, yellow or white. bbg.
- O. spinosissima** Mill.
S. coast of Jamaica. Erect, to 17 ft. high; trunk 3-3½ in.
in diam. Fls. yellow, turning dull red. w.
- O. spinulifera** Salm-Dyck.
(**O. candelabriformis** Martins.)
Mex. Tall, much branched. o.
- O. stanlyi** Engelm.
S.W. N. Mex. to E. Ariz. and adj. Mex. Sts. low, much
branched, creeping, forming broad, impenetrable masses
6½-10 ft. in diam. Fls. yellow. bbg.
- O. streptacantha** Lem.
Mex. Much branched, to 15 ft., joints often orbicular; fls.
yellow to orange.
- O. subulata** (Muhlenpf.) Engelm.
Arg.? Either with simple st. or several main branches,
6-12 ft. Fls. orange or greenish yellow. mnh. Common.
- O. sulphurea** G. Don.
Arg. Low, and spreading. Joints oblong, conspicuously
tuberculate. Spines slender, white with brown base, 1-3
in. long. Fls. yellow.
- O. tenuispina** Engelm.
S.W. Tex. and adj. Mex. and N. Mex. to Ariz. Low and
spreading, but becoming 12 in. high; joints obovate, 3-6 in.
long. Fls. yellow. w.
- O. tetracantha** Toumey.
Ariz. 2 ft. or more high; branches slender, tubercled.
Spines usually in fours, to 1 in. long. Fls. orange to scarlet.
- O. thurberi** Engelm.
W. coast Mex. Large and bushy, 7-14 ft. high. Spines
sheathed. Fls. brownish. w.
- O. tomentosa** Salm-Dyck.
Cent. Mex. 9-20 ft. with broad top and smooth trunk. Fls.
orange. mnh.

O. tortispina Engelm.

S. Dak. to N. Mex. Prostrate. Joints with 2 or more slender, white, yellowish or brown spines at each areole. Fls. sulphur-yellow.

O. treleasei Coulter.

S. Calif. Low to 1 ft., spreading. Fls. rose colored. mnh.

O. trichophora (Engelm.) B. & R.

N. Mex., Tex. and Oklahoma. A low spreading plant, often forming small clumps 2-3 1/2 ft. in diam. Fls. yellow.

O. tuna Mill. PRICKLY PEAR.

(**O. horrida** Salm-Dyck.)

W. Indies and Mex. Tree-like, joints 10-14 in. long, and 6-10 in. wide, deep green. Fls. 3-4 in. wide, yellow. Fr. edible, dark reddish purple. o.

O. velutina Web.

S. Mex. 3-12 ft. Fls. yellow. w.

✓ **O. versicolor** Engelm.

Ariz. and No. Mex. Bush or tree-like, 6-12 ft. Fls. yellow, greenish, reddish or brown. w.

O. viridiflora B. & R.

N. Mex. 1-2 ft. high. Joints slender, with brown spines. Fls. greenish.

O. vulgaris Mill.

(**O. monacantha** Haw.)

Braz. and Arg. Usually with definite trunk, and much branched top, 6-12 or 18 ft. Fls. yellow. Common.

O. vulgaris var. **variegata** Hort.

(**O. monacantha** var. **variegata** Hort.)

Joints blotched with white or yellow. Common.

O. whipplei Engelm. and Bigel.

S. W. U. S. Low, much branched. Areoles filled with light brown wool. Fls. small, yellow. Fr. spineless. mnh.

OREOCEREUS

Plants forming large clusters, usually low, erect, ascending or even prostrate; fls. dark red inside; fr. globular, spineless, dry.

O. celsianus (Lem.) Riccobono.

(**Cereus celsianus** Berg.)

Bolivia, S. Peru, N. Chile. Bushy cactus, 3 1/2 ft. high, slender branches prostrate below, erect above. Fls. dark red. m.

PACHYCEREUS

Usually very large plants, more or less branched, with definite trunks, the sts. and branches stout, columnar, ribbed; fls. diurnal; fr. large, burr-like.

P. marginatus (D C.) B. & R. PIPE ORGAN CACTUS.

(**Cereus gemmatus** Zucc.)

Mex. 10-24 ft. high, erect, usually simple.

PELECYPHORA

Plants small, cespitose, cylindric or globose, tuberculate, watery; tubercles not arranged on ribs, strongly flattened; never grooved; fls. borne near center, broad, bell shaped, purplish; fr. small. w.

P. aselliformis Ehrenb.

Mex. Tufted, cylindric, 2-4 in. high, 1-2 in. in diam., covered with tubercles arranged in spirals. Fls. 1 in. broad or more. w.

PENIOCEREUS

Greek combination meaning thread-cereus. Low, slender erect plants, growing from very fleshy turnip-shaped roots; sts. usually 4- or 5-ribbed; fls. large, nocturnal.

P. greggii (Engelm.) B. & R.

(*Cereus greggii* Engelm.)

W. Tex., S. N. Mex. and Ariz. to Son. and Mex. Roots very large, weighing 60-125 lbs., usually 6-8 in. long by 2-3 1/4 in. in diam.; sts. to 10 ft. high. Fls. white tinged with red, nocturnal. o.

PERESKIA

Leafy trees, shrubs, or sometimes clambering vines, spiny, branching and resembling other woody plants in having large lvs.

P. pereskia (Linn.) Karsten.

W. Indies and C. and N. coasts of S. Amer. Shrub, at first erect but often forming vines. g.

PERESKIOPSIS

Trees and shrubs, in habit and foliage similar to Pereskia; old trunk forming a solid woody cylinder covered with bark; fls. similar to those of *Opuntia*; fr. red, juicy.

P. diguetii (Web.) B. & R.

C. Mex. Tall shrub. Sts. pubescent, normal lvs. abruptly jointed. Fls. yellow. Fr. 1 in. long, red and downy.

P. opuntiaeflora (D C.) B & R.

(*Opuntia golziana* Schum.)

Mex. Shrubby. Fls. reddish yellow.

P. porteri B. & R.

L. Calif. Clambering. Lvs. obovate, sharply acuminate, 1 in. long. Fls. yellow. Fr. orange.

PHELLOSPERMA

A globular to cylindric, usually cespitose cactus with large fleshy branched root; tubercles not grooved above, not milky; fr. globular to cylindric, red.

P. tetrancistra (Engelm.) B. & R.

S. Calif. and Ariz. Cylindric, solitary or cespitose to 12 in. w.

PHYLLOCACTUS

See Epiphyllum.

PSEUDORHIPSALIS

Epiphytic, much branched, and elongated, at first erect, but soon prostrate or hanging; branches flattened, rather thin, serrate or crenate; fls. numerous; fr. globular.

P. alata (Swartz) B. & R.

Mts. of Jamaica. Pendent from trees and rocks, up to 17 ft. long, branched. Fls. yellowish white. mnh.

RHIPSALIS

Sometimes growing in humus but usually epiphytic and hanging from trees, sometimes erect, sometimes clambering over rocks, more or less rooting or, when hanging, irregularly producing aerial roots; sts. usually much branched, terete, angled or much flattened and leaf-like, very slender and thread-like or stout and stiff; fls. opening day or night or remaining open for 1 to 8 days; fr. globular or oblong, sometimes angled when immature, juicy, white or colored.

R. cassutha Gaertner.

Tropics. Usually growing on trunk or branches of large trees, hanging in large clusters, 3½ to 30 ft. long. Branches weak and pendent. Fls. cream colored.

R. cereuscula Haw.

(**R. saglionis** Otto.)

Uruguay to Cent. Braz. Sts. slender, often erect, to 24 in. high, crowned by cluster of short branches. Fls. pinkish to white. mnh.

R. crispata (Haw.) Pfeiff.

(**Epiphyllum crispatum** Haw.)

Braz. Branches divided into short flat joints 2½-4 in. long, broad both at base and apex; green. Fls. solitary, cream-colored to light yellow. Fr. white.

R. teres (Vellozo) Stendel.

Braz. Sts. erect or spreading, woody at base, about ½ in. diam., much branched, especially above, green or blotched with red. Fls. pale yellow.

R. warmingiana Schum.

Braz. At first erect, then spreading or hanging; branches elongated, jointed. Fls. white. w.

SCLEROCACTUS

Usually simple but sometimes clustered, spiny cacti; ribs rather prominent, more or less undulate or tubercled; fls. purplish; fr. oblong to pyriform.

S. polyancistrus (Engelm. & Bigel.) B. & R.

(**Echinocactus polyancistrus** (Engelm. & Bigel.)

Deserts of Calif. and Nev. Simple, globular to oblong, 1-16 in. high. Fls. magenta colored. o.

SELENICEREUS

Slender, trailing, climbing or clambering, elongated cacti, the joints ribbed or angled, irregularly giving off aerial roots; fls. large, often very large, nocturnal, greenish, brownish or orange outside, inside white; fr. large, reddish.

S. coniflorus (Weing.) B. & R.

E. Mex. High-climbing, pale green. Fls. about 9 in. long, lemon-yellow outside, pure white inside.

S. donkelaari (Salm-Dyck) B. & R.

(*Cereus donkelaari* Salm-Dyck.)

Yucatan, Mex. Sts. elongated, creeping or ascending, 27 ft. long or more, slender, about $\frac{1}{2}$ in. thick; ribs 9 or 10, obtuse, often indistinct. Fls. reddish outside; white inside. Fr. unknown.

S. grandiflorus (Linn.) B. & R.

Jamaica and Cuba. Widely planted in tropical America. Sts. clambering, often 1 in. in diam. Fls. salmon colored and white.

S. hamatus (Scheidw.) B. & R.

(*Cereus hamatus* Scheidw.)

S. and E. Mex. Sts. long and clambering, branches strongly 4-angled. Fls. white.

S. macdonaldiæ Hook.

(*Cereus macdonaldiæ* Hook.)

Honduras. Old sts. terete, $\frac{1}{2}$ in. in diam., young sts. 5-angled. Fls. white. m.

S. pteranthus (Link & Otto) B. & R.

(*Cereus nycticalus* Link.)

Mex. Sts. stout, strongly 4-6-angled. Spines dark, conic. Fls. white. w.

STROMBOCACTUS

A low, depressed, nearly spineless cactus, with imbricated scale-like tubercles; fls. small, nearly white; fr. nearly naked.

S. disciformis (D C.) B. & R.

(*Echinocactus turbiniformis* Lawr.)

Cent. Mex. Small, depressed turbinate or semi-globose, 2-2 $\frac{1}{2}$ in. broad. Fls. white.

THELOCACTUS

Cacti of medium size, globular or somewhat depressed; ribs few, low or even indefinite, divided into large, often spiraled, tubercles; fls. rather large, diurnal; fruit dry.

T. bicolor (Galeotti) B. & R.

(*Echinocactus bicolor* Schum.)

Mex. Simple, globose to conic, glaucous, small, up to 1 $\frac{1}{2}$ in. high, very spiny. Ribs usually 8, broad, somewhat tubercled. Fls. large, 2-3 in. long and as broad when expanded, purple. Fr. small, about $\frac{1}{2}$ in. long. w.

T. hexædrophorus (Lem.) B. & R.
(*Echinocactus hexædrophorus* Lem.)

Mex. Globose or somewhat flattened above, glaucous, strongly tubercled, not ribbed, 5-6 in. in diam. Fls. $2\frac{1}{2}$ in. long and broader than long when expanded, purplish. w.

T. pottsii (Salm-Dyck) B. & R.
(*Echinocactus pottsii* Salm-Dyck.)

Chihuahua and Coahuila, Mex. Globular, grey-green, 12-13 ribs, radial spines 7-10, reddish, $\frac{1}{2}$ -1 $\frac{1}{2}$ in. Fls. light purple. w.

TRICHOCEUREUS

Columnar plants, more or less branched; ribs few to numerous, either low or prominent, usually very spiny; fls. nocturnal; fr. without bristles or spines, dull colored.

T. candicans (Gillies) B. & R.
(*Echinocereus candicans* Rumpel.)

Arg. Cespitose, forming large clumps often $3\frac{1}{2}$ to 10 ft. in diam. Fls. white. Nocturnal. m.

T. huascha Web.

N. Arg. Cespitose, forming clumps 6-7 ft. broad. Spines numerous, yellowish to brown. Fls. variable, red to yellow. Rare. w.

T. lamprochlorus (Lem.) B. & R.
(*Cereus lamprochlorus* Lem.)

N. Arg. and Bolivia. Columnar, simple or branching at base, 5-7 $\frac{1}{2}$ ft. high. Fls. red and white. Nocturnal. m.

T. macrogonus (Salm-Dyck) Riccobono.
(*Cereus macrogonus* Salm-Dyck.)

S. Amer. St. probably tall, stout, but in cultivation often slender. Fls. white. Nocturnal. w.

T. macrogonus var. longispinus Hort.

A form with longer spines. Fls. nocturnal. m.

T. schickendantzii (Web.) B. & R.
(*Echinopsis schickendantzii* Web.)

N.W. Arg. Plants simple or cespitose, 6-10 in. high, $2\frac{1}{2}$ in. in diam. Fls. white. Nocturnal.

T. spachianus (Lem.) Riccobono.
(*Cereus spachianus* Lem.)

W. Arg. Upright, first simple, then profusely branching at base. Fls. white. Nocturnal.

T. thelegonoides (Speg.) B. & R.
(*Cereus thelegonoides* Speg.)

N. Arg. More or less branched above; trunk 13-20 ft. high. Fls. white. Nocturnal. w.

WERCKLEOCEREUS

Epiphytic, climbing cacti, the 3-angled branches producing aerial roots.

W. tonduzii (Web.) B. & R.

(*Cereus tonduzii* Web.)

Costa Rica. Sts. rather stout, bushy-branched. Fls. creamy white. w.

WILCOXIA

Plants usually low and weak, producing a cluster of dahlia-like roots; sts. very slender, more or less branched, the branches often only the diameter of a leadpencil; ribs few and low; fls. diurnal, red or purple.

W. poselgeri (Lem.) B. & R.

S. Tex. and Coahuila. Sts. $2\frac{1}{2}$ in. high or less, 1-5 to 2-5 in. thick. Fls. purple or pink. bbg.

ZYGOCACTUS

Sts. forked, much branched, flattened, divided into short joints; fls. polychromic; fr. purple, turgid, not at all angled.

Z. truncatus (Haw.) Schum. CHRISTMAS or CRAB CACTUS.
(*Epiphyllum truncatum* Haw.)

Braz. Joints glossy green, sharply serrate. Sts. flattened. Fls. $2\frac{1}{2}$ in. long, scarlet to white.

PART II---SUCCULENTS

AIZOACEÆ

From the Greek, meaning always alive, refers to the persistence of life in desert habitats. Carpet-weed or Ice-plant family. Erect or prostrate, often fleshy herbs or subshrubs, either the stem or the leaves, or both, curiously modified to reduce surface and store water. Fruit capsular.

MESEMBRYANTHEMUM

Greek name, midday flower; the flowers usually open in sunshine and close in shadow. Fig-marigold. Mostly low-growing succulents, annual or perennial prostrate or erect herbs, and sometimes subshrubs, with thick fleshy usually opposite lvs. which are 3-angled, terete or flat, and with entire or more or less spiny margins; fls. white, red or yellow.

This genus is at present undergoing a general revision. It has been, and is being, split into a considerable number of new genera, based largely upon fruit-characteristics. This work is being carried on by N. E. Brown of Kew, by Dinter and Schwantes in Germany, and Louisa Bolus in South Africa. For the present the old genus name *Mesembryanthemum* is here retained.

Note.—In the following list the new generic names are given as synonyms, wherever established, though in the remainder of the book the older name is given as the synonym.

M. acinaciforme Linn. HOTTENTOT FIG.
(*Carpobrotus acinaciformis* N. E. Br.)

S. Afr. St. articulate, 2-3 ft. long, the young growth compressed. Fls. purple. Fr. size of gooseberry and edible.

M. acuminatum Haw.

S. Afr. Erect, to 2 ft. Fls. white, tinged dingy rose.

M. acutum Haw.

(*Cephalophyllum acutum* L. Bol.)

Cape. Roots like turnips. Stemless. Lvs. cylindrical, thick, upright, pointed. Fls. large, flat, bright amaranth-purple, with silky sheen.

M. æquilaterale (Linn.) Haw.

(*Carpobrotus æquilateralis* N. E. Br.)

Australia, Calif., Chile. Resembles *M. edule* (*Carpobrotus edulis*), except lvs. shorter and grayer. Sts. creeping. Fls. purple. Grows wild on seashore, rarely cultivated.

M. agninum Haw.

(*Punctillaria compacta* Hort.)

(*Stomatium agninum* Schw.)

S. Afr. To 3 in. high. Fls. yellow. mnh.



FAULDING PHOTO

The rocky foreground, the chaparral in the middle distance, and the mountains in the background offer natural advantages for a man-made composition in the Blaksley Botanic Garden.

M. alstonii Marl.

(*Cephalophyllum alstonii* Marl.)

Cape. Short-stemmed. Lvs. long-cylindrical, blunt, glaucous yellow-green. Fls. very large, ruby-red, with violet anthers.

M. amoenum Salm-Dyck.

(*Lampranthus amoenus* N. E. Br.)

Cape. Subshrub with elongated, erect sts. Lvs. not over 2 in. long. Fls. mostly in threes, less than 1 3/4 in. in diam., bright purple. Resembles *M. spectabile* in appearance.

M. angulatum Thunbg.

Cape. Creeping, spreading. Fls. white.

M. aureum Linn.

(*Lampranthus aureus* N. E. Br.)

S. Afr. Shrubby. Fls. large, bright orange.

M. blandum Haw.

S. Afr. 1-1 1/2 ft. high, with numerous branches. Fls. pale rose.

M. bolusii Hook. fl.

(*Pleiospilos bolusii* N. E. Br.)

S. Afr. Stemless. Lvs. 2-4, blunt, with protruding keel, grayish-green, dotted. Fls. yellow.

M. brownii Hook.

(*Lampranthus brownii* N. E. Br.)

S. Afr. Subshrub, 1-2 ft. high. Lvs. less than 1 in. long, roughened. Fls. changing in color, purplish or orange.

M. bulbosum Haw.

(*Trichodiadema bulbosum* N. E. Br.)

Cape. Medium-sized shrub to 8 in. high. Lvs. crowded, about 1/3 in. long, papillose, tipped with cluster of bristles. Fls. solitary, purplish-red. w.

M. calamiforme Linn.

(*Cylindrophyllum calamiforme* Schw.)

S. Afr. St. short, woody. Lvs. glaucescent, cylindric, with a much-thickened base. Fls. on short stout peduncles, solitary, white with pink tips, 2 1/2 in. across.

M. calcareum Marl.

(*Titanopsis calcarea* Schw.)

Cape. Lvs. in dense rosettes, very white-glaucous, bearing a coral-like encrustation on their flattened tips. Fls. golden yellow.

M. caninum var. **vulpinum** Haw.

(*Bergeranthus caninus* Schw.)

S. Afr. Stemless, caespitose. Lvs. bright green, triangular in cross-section, with a few teeth at edges. Fls. yellow.

M. caroli-schmidtii Dint. & Berg.

(*Cheiridopsis caroli-schmidtii* N. E. Br.)

S. W. Afr. Stemless. Lvs. glaucous, spotted, keeled, flattened laterally, of uneven length. Fls. sessile, yellow.

M. caulescens Mill.

(*Oscularia caulescens* Schw.)

S. Afr. Prostrate shrub. Sts. crowded with small, short-triangular, thick, toothed and very glaucous lvs. Fls. small, lavender. mnh.

M. ciliatum Thunb.

(*Trichocyclos ciliatus* N. E. Br.)

S. Afr. Sts. jointed, soon leafless. Fls. white.

M. cinctum L. Bol.

S. Afr. Shrubby, with long pale brown branches. Lvs. deep green, triangular, short-acuminate.

M. comptonii L. Bol.

(*Rhinephyllum comptonii* L. Bol.)

S. Afr. Short-stemmed. Lvs. very rough, thick, blunt, toothed, purplish grey. Fls. yellow.

M. conspicuum Haw.

(*Lampranthus conspicuus* N. E. Br.)

S. Afr. Shrubby. Lvs. narrow, glaucous, crowded at end of sts. Fls. 2-3 in. in diam., red-purple, showy.

M. cordifolium Linn.

(*Aptenia cordifolia* N. E. Br.)

S. Afr. Prostrate, with small heart-shaped dark green lvs. Fls. very small, magenta. Occasionally naturalized in Calif.

M. crystallinum Linn. ICE PLANT.

S. Afr., Greece, Canary Isls., S. Calif. Has unusual glistening foliage, annual or biennial.

M. deltoides var. **muricatum** Haw.

(*Oscularia deltoides* Schw.)

Cape. Small, branched bush, gray lvs. Fls. reddish. Similar to *M. caulescens*, but habit more compact.

M. diversifolium Haw.

S. Afr. Stemless, with large rosettes. Fls. gleaming gold and reddish.

M. dolabriforme Linn.

(*Hereroa dolabriformis* L. Bol.)

S. Afr. Shrubby. Lvs. much flattened laterally, wider at tip, hatchet-shaped, bluntly toothed. Fls. medium-sized, petals yellow, red below; stamens in upright column.

M. echinatum Ait.

(*Delosperma echinatum* N. E. Br.)

(*Trichodiadema echinatum* L. Bol.)

Cape. Thick and bushy, lvs. prickly. Fls. white or yellowish.

M. ecklonis Salm-Dyck.

(*Delosperma ecklonis* N. E. Br.)

S. Afr. Root woody, branched, spreading habit. Fls. white.

M. edule Linn. ELEPHANT'S TOOTH.

(*Carpobrotus edulis* N. E. Br.)

S. Afr. Coarsely trailing. Lvs. fleshy, keeled, turning red. Fls. large, 2 in. in diam., yellowish. Naturalized on Calif. coast. Fr. edible.

- M. elongatum** Haw.
(*Conicosia elongata* N. E. Br.)
Cape. Roots carrot-shaped. Lvs. long and narrow, soft, in upright rosettes from apex of sts. Fls. greenish-yellow. Sand dune species. mnh.
- M. emarginatum** Linn.
(*Lampranthus emarginatus* N. E. Br.)
S. Afr. Compact, with upstanding branches. Fls. violet red.
- M. falciforme** Haw.
(*Lampranthus falciformis* N. E. Br.)
Cape. Low, shrubby, glaucous. Fls. numerous, lavender-pink. w.
- M. felinum** Haw.
(*Faucaria felina* Schw.)
S. Afr. Stemless, edges of the lvs. with recurved teeth. Fls. yellow. w.
- M. filicaule** Haw.
(*Lampranthus filicaulis* N. E. Br.)
Cape. Forms prostrate mats of rooting wiry sts. Lvs. awl-shaped. Fls. crimson-pink.
- M. flexuosum** Haw.
Cape. Shrubby with narrow lvs. Fls. white and yellow. mnh.
- M. floribundum** Haw.
(*Drosanthemum floribundum* N. E. Br.)
(*M. roseum* Hort.)
S. Afr. Creeping. Lvs. small, about 1 in. long, crystalline. Fls. abundant, small, mauve-pink. Common.
- M. formosum** Haw.
(*Lampranthus formosus* N. E. Br.)
Cape. Short-stemmed, with short-leaved branches. Fls. purplish-red.
- M. geminum** N. E. Br.
(*Gibbæum geminum* N. E. Br.)
S. Afr. Cespitose. Lvs. united in pairs, small, velvety, finger-like. Fls. rather small, petals few, wide-spread, mauve; stamens short, upright.
- M. glaucum** Linn.
(*Lampranthus glaucus* N. E. Br.)
S. Afr. Erect, with stiff branches. Fls. light yellow.
- M. gratum** N. E. Br.
(*Conicosia muirii* N. E. Br.)
Little Namaqualand. Very similar to *M. elongatum*.
- M. heathii** N. E. Br.
(*Rimaria heathii* N. E. Br.)
S. Afr. Stemless. Lvs. short, very thick, smooth, translucent; lf.-pairs united into an egg-shaped body.
- M. intonsum** Haw.
(*Trichodiadema intonsum* N. E. Br.)
Cape. Lvs. small, velvety, bearing bristles at tip. Fls. white.

- M. lacerum** Haw.
(*Semnanthe lacerum* N. E. Br.)
S. Afr. Low, shrubby. Lvs. laterally compressed, fringed on keel. Fls. purplish-pink, small.
- M. læve** Thunbg.
(*Hymenogyne lævis* N. E. Br.)
Cape. Prostrate. Lvs. deep green. Fls. large, light yellow.
- M. laxum** Willd.
Cape. Slender creeping branches. Fls. small, whitish, edged with pink.
- M. lehmannii** Eckl. & Zeyh.
(*Corpuscularia lehmannii* Schw.)
S. Afr. Trailing. Lvs. grey-green, thick and stubby, crowded on sts. Fls. small, straw-colored. mnh.
- M. leslei** N. E. Br.
(*Lithops leslei* N. E. Br.)
Transvaal. Lf. pairs united into single button-like bodies, with a transverse slit; top marked with translucent areas; brownish red. Fls. yellow. Plant resembles pebble.
- M. linguæforme** Haw.
(*Glottiphyllum linguæforme* N. E. Br.)
S. Afr. Lvs. unequally tongue-shaped, soft, glossy, sap-green. Fls. large, bright yellow, dandelion-like. mnh.
- M. longum** var. *uncatum* Haw.
(*Glottiphyllum uncatum* N. E. Br.)
Cape. Narrow, pointed keeled lf.
- M. margaretæ** Schw.
(*Argyroderma margaretæ* N. E. Br.)
(*Dinteranthus margaretæ* Schw.)
(*Lapidaria margaretæ* Schw.)
S. W. Afr. Stemless. Lvs. 2-4 to a growth, thick and short, smooth, stone-like, pinkish-white. Fls. golden yellow.
- M. maximum** Haw.
(*Astridia maxima* Dint. & Schw.)
S. Afr. Shrub. Lvs. large, broadly sickle-shaped, much compressed laterally. Fls. small, lavender-pink.
- M. montis-moltkei** Dint.
(*Ebracteola montis-moltkei* Dint. & Schw.)
S. Afr. Cespitose. Lvs. flattened-triangular, narrow, grey-green or purplish, pointed. Fls. creamy or pinkish white.
- M. multiceps** Salm-Dyck.
(*Bergeranthus multiceps* Schw.)
Cape. Stemless, almost grass-like. Fls. yellow tinged with red.
- M. neillii** L. Bol.
(*Gibbæum neillii* L. Bol.)
S. Afr. Lvs. unequal, half united. Fls. purplish.
- M. nobile** Haw.
(*Punctillaria nobilis* N. E. Br.)
S. Afr. Stemless. Lvs. very large, thick, triangular, wider near tip, slightly recurved, unequally spreading,

- grey-green, with darker dots. Fls. large, sessile, petals lax, deep yellow.
- M. obliquum** Haw.
S. Afr. Dwarf, shrubby. Lvs. few, small, terete, crystalline, scattered sparsely along wiry sts. Fls. small, violet-purple.
- M. perviride** Haw.
(*Gibbaeum perviride* N. E. Br.)
S. Afr. Short stemmed. Lvs. unequal, united in pairs, velvety, deep green. Fls. small, reddish.
- M. petrensis** N. E. Br.
(*Argeta petrensis* N. E. Br.)
S. Afr. Stemless. Lvs. very short and thick, angular-ovate, in pairs, greenish-white to chalk-white. Fls. lax-petaled, deep pink. Plant resembles quartz pebbles.
- M. pseudotruncatellum** Berg.
(*Lithops pseudotruncatella* N. E. Br.)
S. W. Afr. Similar to *M. leslei* (*Lithops leslei*), but pale gray, with reddish markings.
- M. pubescens** Haw.
(*Gibbaeum pubescens* N. E. Br.)
Cape. Almost stemless. Lvs. silky-pubescent, semi-cylindrical, oblique at apex. Fls. bright rose-red.
- M. puterillii** L. Bol.
S. Afr. Shrubby trailer. Lvs. small and narrow. Fls. amaranth-purple.
- M. puttkamerianum** Dint. & Berg.
(*Hereroa puttkameriana* Dint. & Schw.)
Great Namaqualand. Stemless. Lvs. in rosettes, rough, grey-green, long and narrow, bluntly keeled. Fls. yellow.
- M. rhomboideum** Salm-Dyck.
(*Rhombophyllum rhomboideum* Schw.)
Cape. Stemless, many branched rosettes. Fls. golden yellow, tipped with red.
- M. rhopalophyllum** Schlechter & Diels. "BABY-TOES."
(*Fenestraria rhopalophylla* N. E. Br.)
S. Afr. Lvs. in rosettes, club-shaped, with a transparent "window" at the tip, bright green. In native habitat plants grow buried to the tips in sand. Fls. daisy-like, white.
- M. roodiæ** L. Bol.
(*Punctillaria roodiæ* N. E. Br.)
S. Afr. Stemless. Lvs. triangular, keeled, large, thick. Fls. large, yellow.
- M. rubricaule** Haw.
Cape. Bush, with stiff, erect, angular branches. Fls. pale purple.
- M. saxetanum** N. E. Br.
(*Conophytum saxetanum* N. E. Br.)
S. Afr. Dwarf plants. Lf.-pairs completely united into a globular body, smooth and pebble-like. Fls. long-tubed, larger than the plant, arising from an aperture at the top of the body, purple.

- M. scapigerum** Haw.
(*Bergeranthus scapigerus* Schw.)
Cape. Stemless. Fls. golden yellow.
- M. simulans** Marloth.
(*Pleiospilos simulans* N. E. Br.)
S. Afr. Another stone-imitating plant. Lvs. generally 2 to a growth, very large and thick, spread flat or recurved, rough, lead-gray. Fls. large, yellow. Similar to *M. bolusii* (*Pleiospilos bolusii*), but without the boat-shaped prominence on the under side of the lf.
- M. speciosum** Haw.
S. Afr. St. becoming 1 ft. high or more, much branched, sometimes decumbent. Fls. brilliant orange-red.
- M. splendens** Linn.
Cape. Many-stemmed shrub, thickly leaved. Fls. cream-colored.
- M. stellatum** Mill.
(*Trichodiadema stellatum* N. E. Br.)
S. Afr. Miniature bushlet, densely leafy. Fls. violet.
- M. stelligerum** Haw.
(*Trichodiadema stelligerum* N. E. Br.)
S. Afr. Shrubby. Lvs. similar to *M. stellatum* (*Trichodiadema stellatum*), but larger, velvety, bearing bristles at tip. Fls. white.
- M. tenuifolium** Linn.
(*Lampranthus tenuifolius* N. E. Br.)
Cape. Shrubby, lvs. terete, glaucous, often reddish. Fls. large, flat, red-purple, with pronounced silky sheen. mnh.
- M. testiculare** Jacq.
(*Argyroderma testiculare* N. E. Br.)
S. Afr. 2-4 lvs. to a growth, very short and thick, smooth, white; fls. yellow. Plant resembles quartz-pebbles.
- M. tigrinum** Haw.
(*Faucaria tigrina* Schw.)
Cape. Similar to *M. felinum* (*Faucaria felina*), but with long, slender, more numerous teeth.
- M. tigrinum** var. *superbum* Hort.
S. Afr. Lvs. more densely white-dotted. Fls. larger than in type.
- M. truncatellum** Haw.
(*Lithops turbiniformis* N. E. Br.)
Cape. Similar to *M. pseudotruncatellum* (*Lithops pseudo-truncatella*).
- M. tuberculatum** Mill.
(*Cheiridopsis tuberculata* N. E. Br.)
S. Afr. Short-stemmed. Lf. pairs closely appressed. Lvs. glaucous, rough. Fls. yellow.
- M. uncinatum** Linn.
(*Ruschia uncinata* Schw.)
Cape. St. diffuse, much branched, grey. Fls. rose colored.
- M. versicolor** Haw.
Cape. Small shrub. Fls. white in sun, red in evening. w.

M. veruculatum Linn.

Cape. Long-branched, trailing, robust grower. Lvs. thick, terete, blue-glaucous, in dense upright fascicles. Fls. small, dull yellow. Does well in sand near beach.

M. vespertinum Berg.

(*Bergeranthus vespertinus* Schw.)

Cape. Many rosettes forming bed. Fls. yellow.

M. vittatum N. E. Br.

(*Aloinopsis vittata* Schw.)

Cape. Stemless. Lvs. soft, wrinkled, forming a mat; roots carrot-like. Fls. light yellow, with reddish mid-stripe.

M. wigettæ N. E. Br.)

(*Conophytum wigettæ* N. E. Br.)

S. Afr. Similar in habit to *M. saxetanum*.

AMARYLLIDACEÆ

Named for a nymph, Amaryllis. Perennial, stout, often fleshy plants as in the Agaves and Aloes. Sometimes tree-like but usually stemless and fibrous rooted, producing numerous young plants by offsets from base.

AGAVE

Name derived from the Greek. agauos, admirable. Important decorative and economic plants from the American deserts, the most familiar of which is *A. americana*, the Century Plant, or American Aloe.

A. albicans Jacobi.

(**A. ousselghemiana** Jacobi.)

Mex. Stemless. Lvs. soft-fleshy, to 2 ft. long, unspotted, not banded, teeth distinct, not forming horny margin. Infl. a spike to 4 ft. tall. mnh.

A. americana Linn. CENTURY PLANT.

Trop. Amer. Lvs. 50-60 in a rosette, 3-6 ft. long, 6-9 in. broad above middle. Fls. greenish. mnh.

A. americana var. **marginata** Trel.

Mex? Lvs. edged with yellow; rosette 7-10 ft. wide. mnh.

A. americana var. **medio-picta** Trel.

Mex? Broad median yellow band. mnh.

A. americana var. **striata** Trel.

Garden form. Lvs. striped.

A. angustifolia Haw.

Cent. Amer.? Short-trunked. Lvs. 3x16-24 in. Fls. greenish. mnh.

A. applanata Jacobi.

E. Mex. Lvs. 4-6x40-60 in. when mature. Infl. 25-30 ft. Fls. yellow. h.

A. atrovirens Karw.

(**A. salmiana** Jacobi.)

S. Mex. Becomes enormous. Lvs. 12x80-100 in. Infl. 20-30 ft. Fls. yellow.

- A. attenuata** Salm-Dyck.
Mex. Trunk 4x5 ft., sometimes prostrate. Lvs. 6-10x25-30 in. Infl. 5-10 ft. Fls. greenish yellow. Common.
- A. cantala** Roxb.
Origin unknown. Lvs. grayish, stiff, 2-6 ft. long, with small, curved, marginal teeth. Infl. bears an abundance of bulbils. Plant suckers freely. mnh.
- A. carchariodonta** Pampan.
Mex. Plant 24-28 in. wide. Infl. 13-14 ft. high. "Shark-toothed."
- A. chiapensis** Jacobi.
Mex. Rosettes 2-3 ft. in diam., clustered. Lvs. grayish, 18-24 in. long, with minute teeth. Infl. a dense spike to 10 ft. high.
- A. chloracantha** Salm-Dyck.
Mex. Trunk sometimes $\frac{1}{2}$ ft. long. Lvs. 30 in a rosette, 18-20 in. long, 4-5 in. broad. Fl. stalk 5-6 ft. long. Fls. bright green.
- A. cochlearis** Jacobi.
(**A. whitakeri** Hort.)
S. Mex. Lvs. large and concave. Fls. yellow.
- A. decipiens** Bak.
Yucatan. Trunk 6-8 ft. Lvs. 2-4x36-50 in. Fls. greenish. Common.
- A. deserti** Engelm.
Colo. desert, Calif. Cespitose. Lvs. 2x6-12 in. Fls. yellow.
- A. ellemeetiana** Koch.
E. Mex. Nearly or quite trunkless. Lvs. spreading, 6x24 in. or more. Infl. 5-10 ft. Fls. greenish white.
- A. fenzliana** Jacobi.
Mex. Lvs. 2 $\frac{1}{2}$ ft. long, 4-6 in. wide. w.
- A. ferox** Koch.
Cent. Mex. Lvs. 12x48 in. Infl. 20 ft. Fls. yellow.
- A. filifera** Salm-Dyck.
E. Cent. Mex. Lvs. 1-1 $\frac{1}{2}$ x8-24 in. Infl. rather stout and dense, 10-15 ft. high. Fls. maroon.
- A. fourcroydes** Lem.
(**A. rigida** var. **elongata** Bak.)
Yucatan. Trunk 3-6 ft. Lvs. 3-4x60-90 in. Fls. greenish. mnh.
- A. franceschiana** Trel.
Mex.? Lvs. 32-34 in. long, 4-4 $\frac{1}{2}$ in. wide. mnh.
- A. franzosinii** Bak.
Mex.? Lvs. very glaucous, 12x80-100 in. Infl. 30 or 40 ft. Fls. yellow. Common.
- A. geminiflora** Gawl.
(**Bonaparteia juncea** Willd.)
W. Mex.? Lvs. very many, $\frac{1}{4}$ in. wide, long, recurving.
- A. ghiesbreghtii** Koch.
S. Mex.? Lvs. 3-4x10-12 in., upcurved-spreading. p.
- A. horrida** Lem.
Mex. Lvs. 30-50 in a dense rosette, 9-12 in. long. Fls. yellowish green. w.

- A. horrida var. micracantha** Bak.
Cent. Mex. Lvs. oblanceolate-oblong, spreading, 3x12 in.
Infl. moderately slender. Fls. yellowish or purplish green.
- A. ingens var. picta** (Salm-Dyck) Berg.
Mex.? Lvs. edged with gold.
- A. kerchovei** Lem.
S. Mex. Lvs. 3-4x16-20 in. Infl. dense and heavy, 18 ft.
- A. lophantha** Scheidw.
(**A. lecheguilla** Torr.)
Mex. Lvs. spreading, 1½-2x12-18 in., green with paler
central band. Infl. 7-15 ft.
- A. macracantha** Zucc.
S. Mex. Nearly trunkless. Lvs. 1x8-20 in. Infl. rather
sparse.
- A. marmorata** Roezl.
S. Mex. Lvs. outcurving, 10-15x72 in. Infl. ample. Fls.
golden.
- A. mitriformis** Jacobi.
Mex. Rosettes solitary, 5-6 ft. in diam. Lvs. dark dull
green, thick, to 3 ft. long, prominently toothed at edges,
end spine decurrent. Fls. crowded in a rather dense panicle
at apex of stout shaft.
- A. muilmannii** Jacobi.
Probably Mex. Lvs. about 30 in a rosette, 2 ft. long, 2
in. broad at middle. Fl. stalk 4-5 ft. long.
- A. nickelsiae** Hort.
(**A. ferdinandi-regis** Berg.?)
Resembles *A. victoriæ-reginæ*.
- A. pachyacantha** Trel.
L. Calif. on N.W. coast. Lvs. 10-16 in. long, 4-5 in. wide.
- A. palmeri** Engelm.
S.E. Ariz., S.W. N. Mex. Lvs. 3½ ft. long, 2-5 in. wide. Fls.
greenish to yellow. o.
- A. polyacantha** Haw.
(**A. chiapensis** Jacobi?)
(**A. uncinata** Jacobi?)
S. Mex.? Cespitose. Lvs. 2-5x10-24 or 36 in. Infl. 4-5 ft.
- A. pruinosa** Lem.
Mex. Lvs. 10-20 in a rosette, spreading, 2 ft. long, 5 in.
broad above middle.
- A. regeliana** Jacobi.
Origin unknown. Rosettes stemless. Lvs. few, with sharply
set-off end spine, the latter not decurrent, and with large
marginal teeth. Infl. a large panicle. mnh.
- A. rupicola** Regel.
Mex. Dwarf, almost spineless. Fls. yellowish.
- A. salmiana** Jacobi.
S. Mex. Lvs. outcurved, ascending. Infl. 20-30 ft.
- A. schidigera** Lem.
(**A. filifera var. adornata** Scheidw.)
E. Cent. Mex. Lvs. upcurved-spreading. Infl. stout and
dense, 10-15 ft. Fls. maroon.

- A. schottii** Engelm.
S. Ariz. Lvs. $\frac{1}{2}$ -1 ft. long, $\frac{1}{2}$ in. broad, rigid. Infl. 5-6 ft. high. o.
- A. shawii** Engelm.
S. W. Calif. and adj. L. Calif. Lvs. 3-5x8-20 in. Infl. 10 ft., congested. Fls. yellow. Common.
- A. sisalana** Perr.
(**A. rigida** var. **sisalana** Engelm.)
Yucatan or Chiapas? Trunk 3-6 ft. Lvs. 4x60 in. Fls. greenish. mnh.
- A. stricta** var. **rubrifolia** Hort.
Mex. Short-branched sts. bearing dense globose rosettes of stiff, very narrow, foot-long, sharp-pointed lvs. Infl. 7 ft. high.
- A. tequilana** Web.
Mex. Lvs. spreading, $3\frac{1}{2}$ ft. long, 3 in. wide.
- A. utahensis** Engelm.
Grand Canyon region. Cespitose. Lvs. erect, spreading, 1-2x6-12 in. Infl. 5-15 ft. Rare.
- A. utahensis** var. **nevadensis** Engelm.
Mohave desert to Nev. and Utah. Differs from the type in the lvs. which are only slightly inrolled near apex, with the end spine longer and more slender; perianth-tube shorter and stouter, segments slightly shorter.
- A. verschaffeltii** Lem.
S. Mex. Lvs. 3x6-8 in. Fls. yellowish. mnh.
- A. victoriae-reginae** Moore.
N. E. Mex. Lvs. in a globose cluster, 1-2x6-8 in. Infl. 10-12 ft. Fls. greenish yellow. h.
- A. weingartii** Berg.
Guatemala. Rosettes stemless. Lvs. 2-4 in. long, grayish-green, rough on back, with decurrent, slender end spine and minute marginal teeth, which last do not extend to apex. mnh.

FURCRÆA

Named for a French chemist, Antoine Francois de Fourcroy. These are succulent desert plants from tropical America; some with spiny foliage, like Agave, others with minutely toothed margins. They occasionally bear immense loose panicles of greenish white fls. As a rule, they bear fr. but once, then die without producing suckers. However, they produce while in flower an immense number of bulbils, which may be used for propagation.

- F. elegans** Tod.
Mex. Trunk none or very short. Lvs. 5-6 in. long, keeled. Infl. 20-25 ft. tall. gg.
- F. gigantea** var. **willemetiana** Roem.
(**F. commelinii** Auct.)
S. E. Braz. Stemless or nearly so. Lvs. 4-6 ft. long, dark

green, with fetid sap. Infl. a panicle to 25 ft. tall. Fls. whitish. Bulbils numerous.

F. roezlii Andre.

S. Mex. Trunk becoming 6 ft. or more. Infl. 10-15 ft. Fls. greenish-white.

F. selloa var. **marginata** Trel.

(**F. lindenii** Jacobi.)

Colombia. Trunk 3-5 ft. Lvs. spreading, concave, yellow striped, 3x50 in. Infl. tall, stalked.

MANFREDA

Named after an ancient writer on simples. Acaulescent bulbous plants, closely allied to Agave. The lvs. of most species are wavy or crimped at the margin.

M. maculosa Rose.

(**Agave maculata** Regel.)

(**Agave maculosa** Hook.)

Tex. and N. Mex. Lvs. 12-20 in a rosette, spreading, $\frac{1}{2}$ -1 ft. long, $\frac{3}{4}$ -1 in. broad at middle. Fls. purplish green.

M. variegata Rose.

(**Agave variegata** Jacobi.)

S. Tex. and adj. Mex. Lvs. channeled, mottled. Infl. 3-4 ft. high. Fls. subsessile, $1\frac{1}{4}$ - $1\frac{1}{2}$ in. long, yellow.

ASCLEPIADACEÆ

Named for Aesculapius. Milkweed family. Herbs or shrubs, sometimes fleshy, often climbing, generally with milky juice. Flowers often hairy, ill-smelling, dull-colored.

HOODIA

Sts. large, many-ribbed, ribs with hard, woody teeth. Fls. from top of sts., large, the petals united, forming a shallow cup, solitary or in small clusters, yellowish, purplish or tawny.

H. bainii Dyer.

S. Afr. Sts. cylindrical, gray. Ribs bearing numerous brown spines, $\frac{1}{2}$ in. long. Fls. large, whitish, shallow, several from top of st.

HUERNIA

Named for Justus Huernius or Heurnius, collector of Cape plants. Succulent dwarf perennial, resembles Stapelia. Fls. numerous, angles of corolla between lobes toothed.

H. longituba N. E. Br.

Cape. Sts. 1-2 in. high, sharply 4-5 ribbed, pale green or reddish. Fls. bell-shaped, tuberculate on the inside, cream with red spots, about $\frac{3}{4}$ in. in diam.

H. penzigii N. E. Br.

Abyssinia. Sts. 2-4 in. high, 5-7 ribbed, teeth long and slender. Fls. $\frac{1}{2}$ in. wide from base of sts., velvety black-purple, cup-shaped.

HUERNIOPSIS

Huernia-like. Monotypic genus. Outer corona absent, tips of petals free, corolla campanulate. Fetid at night.

H. decipiens N. E. Br.

S. Afr. Sts. dwarf, trailing, 2 in. long, $\frac{1}{2}$ in. thick; 4-5 ribbed, teeth short. Fls. small, petals recurved, purple blotched with yellow.

SARCOSTEMMA

Name refers to fleshy corona. To this genus N. E. Brown refers a plant long known as *Euphorbia pendula*.

S. viminale R. Br.

(*Euphorbia pendula* Link.)

Trop. Afr. Trailing, twining or bushlike. Fls. greenish white or sulphur colored.

STAPELIA

Named for J. B. Van Stapel, Dutch physician. Odd fleshy cactus-like plants. Sts. low, leafless, coarsely 4-angled.

S. asterias Maas.

? Dwarf; sts. mostly curved. Fls. violet-purple with yellowish bars.

S. bella Berg.

European hybrid. Sts. erect, branching at or above the base, 5-7 in. high, dull green. Fls. 3-4 together at the base of the young sts., inner face deep purplish red, browner toward the tips of the lobes, paler at the center.

S. gigantea N. E. Br.

Trop. and S. Afr. Sts. erect, branching from a short decumbent base, 4-8 in. high. Fls. very large, light ochre-yellow. w.

S. glabriflora N. E. Br.

S. Afr. Sts. erect, 4-9 in. high. Fls. dull reddish purple.

S. grandiflora Maas.

S. Afr. Sts. 6-12 in. high. Fls. dark purple-brown.

S. pillansii N. E. Br.

S. Afr. Sts. rather crowded, 4-7 in. high. Fls. 2-5 together, near the base of the sts., 4-5 $\frac{1}{2}$ in. in diam., purple-brown without markings, shining, closely ciliate with soft light purple, simple hairs.

S. variegata Linn.

S. Afr. Sts. erect from a decumbent base, 2-6 in. high. Fls. pale greenish yellow with purple brown spots.

S. variegata var. atropurpurea N. E. Br.

S. Afr. Sts. erect from a decumbent base, 2-6 in. high. Fls. blackish-purple with purple-brown spots.

TRICHOCAULON

From the Greek words, meaning hair and stem. Small, globose plants, somewhat resembling Mammillarias in habit; sts. with many irregular ribs, bearing bristles or scales; fls. small, 5-parted, from top of sts.

T. officinale N. E. Br.

Bechuanaland. Sts. about 1½ in. thick, ribs bearing tubercles ending in bristly spines. Fls. bell-shaped, 1½ in. in diam., dark purple-brown. Plant has medicinal properties.

BROMELIACEÆ

Named in honor of Claus Bromel, a Swedish botanist. Pineapple family. Herbs or sub-shrubs.

BILLBERGIA

Named after a distinguished Swedish botanist, J. B. Billberg. Tropical American epiphytes. Lvs. spiny-edged. Fls. showy, usually with colored bracts.

B. nutans Wendl.

Braz. Fls. in gracefully nodding racemes, rose, green and blue. Lvs. long, narrow, pointed.

BROMELIA

Named for Bromel, a Swedish botanist. Tropical American epiphytes with pineapple-like lvs. and heads of showy fls.

B. fulgens Lem.

Braz. Lvs. 15-20 in a dense rosette, strap shaped. Fls. blue. w.

B. sceptrum Fenzl. HEART OF FLAME.

(**B. fastuosa** Lindl.)

S. and C. Braz. Stemless, suckering. Lvs. 3-4 ft. long, recurved, prickly at edges, the innermost turning red at time of flowering. Fls. in a panicle to 3 ft. tall, petals violet-red. mnh.

DYCKIA

Named after Prince Salm-Dyck, German botanist. Succulents, somewhat resembling century plants, but with smaller spines, as a rule; usually stemless; lvs. forming dense rosettes.

D. rariflora Schult.

Braz. Lvs. form dense rosettes. Fls. orange-scarlet.

D. sulphurea C. Koch.

Braz. Lvs. form dense rosettes. Fls. yellow.

GREIGIA

Named for Major-General Greig, Russian horticulturist. A species of large Andine, terrestrial, or rock-loving herbs.

G. sphacelata Regel.

Chile. Stout pineapple-like plant, 3 ft. high. Fls. rose colored.

HECHTIA

Named for J. G. H. Hecht. Succulent plants with dense rosettes of recurved spiny lvs., which are purple above, from the middle to the tip, and silvery beneath.

H. argentea Bak.

Mex.? Lvs. about 1 ft. long, stiff, shining, silvery. Fls. white.

H. glomerata Zucc.

Mex. Lvs. 10-18 in. long, rigid, leathery. Fls. white. h.

PUYA

Chilean name. Large rock plants.

P. alpestris Poepp.

Chile. Fl. cluster much branched. Fls. very large and showy, dull metallic blue.

P. chilensis Molina.

Chile. 4-5 ft. or more high, sometimes branching. Fls. yellow or greenish yellow.

P. thomasiana André.

Peru. Much branched at base, forming large mass. Fls. up to 3 ft. high, dull red and green, in wide panicle. w.

RHODOSTACHYS

From Greek rhodon, rose, and stachys, spike. Nearly stemless, rosette-forming plants with narrow, spine-toothed lvs. and terminal sessile fl. heads, pineapple-like; inner lvs. colored at flowering time.

R. pitcairniæfolia Benth. & Hook.
(*Fascicularia pitcairniæfolia* Auct.)
(*Greigia vulcanica* Hort.)

Chile. Lvs. in dense rosettes, slender, recurved. Fls. in dense head at center of rosette, blue violet. Surrounding lvs. turn bright red in lower half during flowering.

COMPOSITÆ

Name refers to aggregation of flowers into heads or false flowers, i.e., composite flowers.

KLEINIA

A genus of shrubby or sub-shrubby plants, mainly from Africa, with succulent lvs. or sts., otherwise closely related to and usually distinguished with difficulty from the large genus *Senecio*. Fl. heads usually greenish white, rarely red, rayless.

K. acaulis (Linn. fl.) D C.

S. Afr. Lvs. 4 to 6 in. long, terete, hooked at tip, dark green. Roots tuberous.

K. anteuphorbium (Linn.) D C.

Morocco to Cape. Erect subshrub, 3-4 ft., with upright cylindrical branches. Lvs. lanceolate, scattered. Fls. greenish, sometimes yellowish white.

K. articulata (Linn. fl.) Haw. CANDLE PLANT.

Cape. Sts. jointed like sausage links, glaucous. Lvs. deeply cut, arrow-shaped, flat, stalked. Fls. greenish white, heads without rays.

K. ficoides (Linn.) Haw.

(*K. pugioniformis* Hort.)

S. Afr. Subshrub; branches ascending. Lvs. compressed laterally, pointed, bluish glaucous. Fls. white.

K. fulgens Hook. fl.

Natal. Sts. gnarled, densely leafy. Lvs. flat, broadly lanceolate, few-toothed, glaucous. Fls. bright red. Rare.

K. mandraliscæ Tineo.

Cape. Similar to *K. ficoides* but lvs. not flattened.

K. neriifolia Haw.

Canary Isls. Like *K. anteuphorbium* except lvs. narrower, usually crowded at end of shoots. Large shrub, with jointed, club-shaped branches.

K. radicans (Linn. fl.) Haw.

Cape. Lvs. blue. Sts. creeping.

K. repens (Linn.) Haw.

Cape. Sub-shrub. Lvs. 2 in. long, blunt, glaucous. Fls. white.

K. tropæolifolia (Mac Owan) ?

(*Senecio tropæolifolia* Mac Owan.)

S. Afr. and Canary Isl. Fleshy subshrub about 1 ft. high. Branches trailing. Lvs. glaucous gray-green, nasturtium-shaped. Fls. bright yellow, heads rayless.

OTHONNA

Ancient Greek name, of no particular application here. Herbs or shrubs, heads usually yellow, sometimes plant is called "little pickles" because of its cylindrical pulpy leaves.

O. crassifolia Harv.

S. Afr. Perennial, becoming shrubby at base in its native country, glabrous, with slender trailing or drooping sts. Fls. yellow. Common.

CRASSULACEÆ

Name is from the diminutive crassula, meaning thick. Herbs or sub-shrubs; leaves mostly alternate, commonly fleshy.

AEONIUM

Note:—The following species have recently been segregated from the genus *Sempervivum*, and classified under *Aeonium*. The validity of this genus seems to be in question, but is here given for convenient reference.

A. arboreum (Linn.) Webb & Berth.

(*Sempervivum arboreum* Linn.)

Medit. reg. St. arborescent, with terete branches. Lvs. spreading. Fls. golden yellow.

A. arboreum var. **atropurpureum** Hort.

(*Sempervivum arboreum* var. *atropurpureum* Hort.)

A purple-leaved form of the last. mnh.

A. caespitosum x **barbatum** Hort.

(*Sempervivum barbatum* Webb & Berth.)

(*Sempervivum caespitosum* Hort.)

Garden hybrid. Lvs. striate on back, rosettes short-stemmed. Fls. yellow.

A. canariense (Linn.) Webb & Berth.

(*Sempervivum canariense* Linn.)

Canary Isls. Sub-shrub. St. short. Lvs. thick and hairy, in a large rosette. Fls. pale yellow or whitish.

A. chrysanthum Webb & Berth.

(*Sempervivum chrysanthum* Hochst.)

Abyssinia. Sub-shrub, 1-2 ft. high. Fls. yellow. mnh.

A. decorum Webb.

(*Sempervivum decorum* Christ.)

Canary Isls. Low, shrubby. Lvs. tinged red in rosettes at end of branches. Fls. cream-white.

A. domesticum (Praeg.) Berg.

(*Sempervivum tortuosum* D C.)

Canary Isls. Dwarf, lax rosettes of hairy lvs. on herbaceous sts.

A. domesticum var. **variegatum** (Praeg.) Hort.

(*Sempervivum tortuosum* var. *variegatum* Hort.)

A prettily white-variegated form of *A. domesticum*.

A. glutinosum (Ait.) Berg.

(*Sempervivum glutinosum* Ait.)

Madeira. Lvs. in rosettes on viscid stems.

A. haworthii (Salm-Dyck) Webb & Berth.

(*Sempervivum haworthii* Salm-Dyck.)

Canary Isls. Shrubby, much branched; rosettes numerous.
Lvs. gray, relatively thick. Fls. yellowish white.

A. holochrysum Webb & Berth.

(*Sempervivum holochrysum* Christ.)

Canary Isls. Tall subshrub, to 2 ft. Lvs. marked brown.
Fls. creamy white.

A. smithii (Sims) Webb & Berth.

(*Sempervivum smithii* Sims.)

Canary Isls. Annual; not worth cultivating.

A. tabulæforme (Haw.) Webb & Berth.

(*Sempervivum tabulæforme* Haw.)

Canary Isls. Lvs. forming a flat, table-like top, very attractive. Fls. yellow.

A. urbicum C. Smith.

(*Sempervivum urbicum* C. Smith.)

Canary Isls. Shrubby. Sts. erect, 3 ft. high, simple, stout.
Fls. pale yellow.

A. velutinum (N. E. Br.) Auct.?

(*Sempervivum velutinum* N. E. Br.)

Canary Isls. Shrubby, much branched, rosettes numerous.
Lvs. gray, downy, relatively thick. Fls. yellowish white.

AICHRYSON

Sempervivum is a synonym. Differs from allied genera in the more or less united carpels, the presence of ciliate scales at the base of the latter, and in being annual or monocarpic, with scattered lvs.

A. dichotomum Webb & Berth.

Canary Isls. Dichotomously branching sts. Rosettes terminal, few, hairy.

ALTAMIRANOA

Named after Altamirano, a distinguished Mexican botanist. Low, much-branched perennials with the habit and foliage of *Sedum*, but with the petals united into a distinct tube. On account of the tubular fls., some of the species were first described as *Cotyledon*, with which they have little else in common. They develop at the base or on the branches curious rosettes of lvs.

A. elongata Rose.

(*Sedum nicæense* All.)

Mex. Perennial with sts. and lvs. downy. Lvs. $\frac{1}{4}$ in. long. Fls. white or pinkish.

BRYOPHYLLUM

Greek name, sprouting lf. Erect, fleshy, branched perennials. Lvs. opposite, simple or pinnate. Margins commonly crenate-dentate.

B. aliciae (Hamet) Berg.

(*Kalanchoe aliciae* Hamet.)

Madagascar. Height to 4 ft.; whole plant glandular-hairy. Lvs. 1-2 in. long, sometimes eared at base. Fls. red, to 1 in. long.

B. crenatum Bak.

Madagascar. St. 2-3 ft. high, from thick, fibrous root. Lvs. very fleshy. Fls. yellow-orange to red. mnh.

B. daigremontanum (Hamet & Perrier) Berg.

(*Kalanchoe daigremontana* Hamet & Perrier.)

Madagascar. Lvs. to 5 in. long by 1-2 in. broad, the lowest peltate, acutely-denticulate. Fls. rose-colored, $\frac{1}{2}$ - $\frac{3}{4}$ in. long.

B. pinnatum Kurz.

(*B. calycinum* Salisb.)

Tropics of both hemispheres. 2-4 ft. high. Fls. greenish white. w.

B. tubiflorum Harv.

(*Kalanchoe tubiflora* Hamet.)

Madagascar. St. to over 2 ft. tall. Lvs. 2-5 in. long, terete or nearly so, spotted green at apex, with 5-7 teeth, between which arise numerous bulbils that make propagation easy. Fls. red, to 1 in. long, in flat, terminal clusters.

BYRNESIA

Monotypic genus, named after E. M. Byrnes, of the U. S. Department of Agriculture. Closely related to *Graptopetalum*. Petals spreading, spotted.

B. weinbergii Rose.

(*Cotyledon paraguayense* N. E. Br.)

(*Graptopetalum weinbergii* (Rose) E. Walther.)

Origin unknown. Thick, angular, diamond-shaped lvs., glaucous, tinged with pinkish-mauve, in terminal rosettes. Fls. greenish-white.

COTYLEDON

Name used by Pliny, meaning a cavity, having reference to the concave or cup-like lvs. of some species. Succulent herbs or shrubs, rarely annual.

C. macrantha Berg.

(*C. orbiculata* var. *rotundifolia* Hort.)

S. Afr. 2-4 ft. high. Lvs. in rosettes, large, round, red-margined. Fls. scarlet.

C. orbiculata Linn.

S. Afr. Erect, 2-4 ft. high. Lvs. broad, stout, white-glaucous, red-margined. Fls. reddish orange.

C. papillaris Thunb.

S. Afr. Lvs. swollen, small, spindle-shaped, on weak branching sts.

C. undulata Haw.

S. Afr.? Dwarf plant, white powdery leaves with wavy edges, becomes woody at st.

C. van der heydeni Hort.

(*Adromischus van der heydeni* Hort.)

S. Afr. Dwarf caespitose rosettes of thick spatulate lvs., gray with brown markings.

C. wickensii Schonl.

S. Afr. St. to 1 ft. tall. Lvs. opposite, elongated, gray-green. Fls. red.

CRASSULA

Latin name meaning thick, referring to the thick lvs. and sts. Fleshy and leafy shrubs or herbs.

C. arborescens Willd.

Cape. Fleshy, erect shrub, to 8-10 ft. Rarely flowers.

C. cordata Soland.

S. Afr. Slender and shrubby, 1-3 ft. Fls. reddish, sometimes pure white.

C. elata N. E. Br.

Cape. Trailing habit. Lvs. clasping hairy sts. Fls. white, in whorls, on long trailing sts.

C. falcata Wendl.

(*Rochea falcata* D C.)

Cape. 3-8 ft. high. Lvs. flattened, sickle-shaped, velvety, gray, grown together at base. Fls. crimson, rarely white. w.

C. lactea Soland.

Cape. Trailing-shrubby. Sts. thick. Lvs. dark green. Fls. white.

C. lycopodioides Lamb.

S. Afr. Dwarf, shrubby, resembles seedling pines.

C. lycopodioides var. **pseudolycopodioides** (Dint. & Schw.) Berg.

(*C. pseudolycopodioides* Dint. & Schw.)

S. W. Afr. Similar to type but dark grayish green.

C. multicava Lem.

(*C. quadrifida* Bak.)

Cape reg. Perennial. Fls. white, tinged red. mnh.

C. obvallata Linn.

S. Afr. Sts. decumbent, to 2 ft. long. Lvs. knife-shaped, smooth, ciliate at edges. Fls. greenish white. w.

C. perfoliata Linn.

(*C. elongata* Hort.)

S. Afr. Sts. 2-3 ft. high. Lvs. in 4 rows, dull gray-green, about 3 in. long. Fls. red to white.

C. perforata Thunb.

(*C. perfossa* D C.)

S. Afr. Similar to *C. rupestris*, but sts. trailing and the lvs. of each pair truly connate at base. Fls. whitish.

- C. portulacea** Lamb.
S. Afr. Shrub. Fls. pinkish.
- C. rupestris** Thunb.
(**C. monticola** N. E. Br.)
S. Afr. Similar to *C. perforata* but lvs. distinct to base.
Habit upright. mnh.
- C. schmidtii** Regel.
(**C. impressa** N. E. Br.)
(**C. rubicunda** Hort.)
Cape. Sts. slender, short, tufted. Lvs. narrow, tinged and dotted red. Fls. deep red.
- C. spathulata** Thunb.
Cape. Slender and trailing. Lvs. stalked, roundish, shiny above. Fls. small, rosy or flesh-colored.
- C. tetragona** Linn.
S. Afr. Shrubby; branches straight, upright, jointed. Lvs. awl-shaped, rounded, but obscurely angled; bright green. Fls. terminal, small, white. Grows readily from cuttings. First species to be introduced into cultivation.

DUDLEYA

Named for the botanist, Dudley. Low perennials with flat, acute basal lvs.; fls. in short or elongated cymes, orange, yellow, red or greenish to white.

- D. caespitosa** (Haw.) B. & R.
(**Cotyledon caespitosa** Haw.)
Calif. coast. Sts. $\frac{1}{8}$ - $1\frac{3}{4}$ in. high. Lvs. 2-3 in. long. Fls. yellow or pale.
- D. compacta** Rose.
C. Calif. Rosettes very compact. Lvs. short, dark green with reddish tips. Fls. pale straw-yellow.
- D. cotyledon** (Jacq.) B. & R.
(**Cotyledon californica** Bak.)
Calif. Plant acaulescent. Lvs. in a rosette, slightly yellowish, tinged with red, 8 in. long. Fls. pale yellow on weak sts., 6 in. long.
- D. ingens** B. & R.
Mex. Large rosettes. Lvs. powdery white.
- D. lanceolata** B. & R.
(**Cotyledon lanceolata** Benth. & Hook.)
S. Calif. Acaulescent. Lvs. in a rosette, green or slightly glaucous, slightly mealy. Fls. red and yellow.
- D. laxa** (Lindl.) B. & R.
(**Cotyledon laxa** (Lindl.) Brew. & Wats.)
Calif. 7-12 in. high. Rosettes lax. Lvs. 1-3 in. long. Fls. clear yellow or orange, turning reddish on drying.
- D. lingula** (S. Wats.) B. & R.
(**Cotyledon lingula** S. Wats.)
San Simeon Bay, Calif. St. short, crowned by a dense cluster of green lvs.

D. lurida Rose.

S. Calif. Lvs. in rosettes. Fls. greenish on reddish sts.

D. plattiana B. & R.

(*Cotyledon plattiana* Jepson.)

C. Calif. Lvs. reddish, glaucous, flat. Fls. yellowish.

D. pulverulenta B. & R.

(*Cotyledon pulverulenta* Bak.)

S. Calif. Plants 1 ft. diam. Lvs. silvery green, very mealy.
Fls. pale scarlet or coral.

D. purpusii B. & R.

(*Cotyledon purpusii* Nichols.)

S. Calif. Cespitose, with glaucous foliage. Fls. in a branching upright cluster, scarlet with golden yellow tips.

D. rigidiflora Rose.

Calif. Lvs. linear-oblong, white-farinoso. Infl. to 16 in. tall. Fls. yellow.

D. septentrionalis Rose.

N. Calif. Lvs. very glaucous, ridged above; rosettes compact. Fls. yellowish.

ECHEVERIA

Named for Atanasio Echeverria, Mexican botanical draughtsman. Lvs. fleshy, but usually broad and flat, commonly making dense rosettes. This genus has been united by many authors with *Cotyledon*.

E. campanulata Kunze.

Mex. Related to *E. gibbiflora*. St. 1-2 ft. tall, crowned by rosette of large, glaucous-green lvs. Infl. a tall panicle of orange-red fls., calyx-lobes narrow, reflexed.

E. coccinea D C.

Cent. Mex. St. 1-2 ft. high. Lvs. downy. Fls. scarlet.

E. elegans Rose.

Pachuca, Mex. Stemless. Lvs. numerous, almost white, forming very compact rosettes. Fls. pinkish with yellow tips.

E. flammea Hort.

Related to *E. gibbiflora*. Lvs. thick, opalescent sunrise-yellow, at top of evident st. Fls. in large panicles, pale coral.

E. funckii Hort.

Mex. Dwarf, tufted. Lvs. gray-green.

E. gibbiflora D C.

Mex. Sts. often tall, 2 ft. high or more. Lvs. 10-20 in a close rosette, often highly colored. Infl. in form of a panicle.

E. gibbiflora var. *grandis* Morr.

(*E. grandis* Hort.)

Origin unknown. St. stout. Lvs. few, large, red-margined. Infl. similar to *E. gibbiflora*.

E. gibbiflora var. *metallica* Bak.

Mex. Similar to *E. gibbiflora*, but with more highly colored, broader lvs.

- E. glauca** Otto. "HEN AND CHICKENS."
Mex. Dwarf, tufted. Fls. red and yellow.
- E. glauca var. major** Hort.
Similar to the type, but lvs. larger and in larger rosettes.
Infl. often branched.
- E. goldmannii** Rose.
Mex. Sub-shrub. Lvs. narrow, dark green. Fls. red.
- E. hoveyi** Hort.
Lvs. striped pale green, white and rose colored.
- E. leucotricha** Purpus.
Mex. Dwarf, shrubby habit. Lvs. thick, with red sts.
and white hairs.
- E. linguæfolia** Lem.
Probably of hybrid origin. Sts. 1 ft. or more high, very
leafy. Lvs. thick, fleshy, green, nearly terete at base.
Infl. long and drooping, each made up of simple racemes.
Fls. cream-colored.
- E. multicaulis** Rose.
Mex. Subshrub. Lvs. spatulate, glossy, bright green to
red. Fls. red.
- E. nodulosa** (Bak.) Otto.
Mex. Subshrub. Lvs. narrow, gray green, with reddish
margins, V-shaped red mark on face. Fl. stem 1-2 ft. high.
- E. pachyphytoides** L. de Smet.
(*Pachyphytum bracteosum* x *E. metallica*.)
Lvs. thick. Fl. scape 1 ft. high. w.
- E. peacockii** Croucher.
(*E. desmetiana* Hort.)
Mex. Stemless. Lvs. about 50 in a close rosette, very
glaucous. Fls. bright red.
- E. pulvinata** Rose.
(*Cotyledon pulvinata* Hook.)
Mex. St. 4-6 in. high, somewhat branching. Lvs. thick
and hairy. Fls. scarlet. o.
- E. pumila** Bak.
Mex. Cespitose; dwarf rosettes of glaucous narrow lvs.
Fls. red, yellow-tipped.
- E. pumila var. fasciata** Hort.
Dwarf, crested.
- E. retusa** Lindl.
Mex. Short-stemmed, scarcely branching. Lvs. 3-4 in.
long, green, with crenulate, reddish edges. Fls. in short,
cymose panicle, bright red. w.
- E. rosei** Nels. & McB.
(*E. gigantea* Hort., not Rose.)
(*E. palmeri* Rose.)
Mex. Sts. short, sprouting from base; large dense rosettes.
Lvs. short and blunt, 4-6 in. long, glaucous, red-margined.
Fls. orange-red, in large compound panicle.
- E. x scaphophylla** Berg.
(*E. scaphylla* Deleuil.)
Garden hybrid of *E. linguæfolia* and *Urbinia agavoides*.
Lvs. in large rosettes, thick, sharp-pointed, upcurved, 2-3
in. long. Fls. insignificant.

E. secunda Booth.

Mex. Rosettes stemless, clustered. Lvs. apple-green, 1-2 in. long. Infl. a simple raceme. Fls. orange.

E. setosa Rose & Purpus.

Mex. Stemless, offseting from base. Lvs. densely setose. Petals red at base, yellow at tips.

E. simulans Rose.

(E. agavoides Hort. not Lem.)

Mex. Similar to *E. elegans*, but with glossy, yellow-green to reddish lvs.

E. sprucei Bak.

Ecuador. Shrubby, 2-3 ft. Lvs. awl-shaped, glaucous, tinged red.

E. stolonifera (Bak.) Otto.

Mex. Rosettes of pale green lvs. on creeping sts. Fls. yellow.

E. turgida Rose.

(E. nobilis Hort.)

Mex. Stemless; cespitose. Lvs. turgid, blunt, grayish-green tinged purplish. Infl. a simple or branched raceme. Fls. orange.

E. venezuelensis Rose.

Venezuela. Sts. to 2 ft. high. Lvs. thin, glaucous. Fls. pink. Rare.

E. whitei Rose.

Mex. Stemless rosettes of narrow bronzed lvs. Fls. dark red.

GRAPTOPETALUM

From Greek word meaning to write, referring to marks on petals. Dwarf, rosette-forming plants of S.W. U. S. and Mex., with spotted petals.

G. orpetii E. Walther.

Ariz. Stemless, cespitose. Lvs. narrow, finely papillose. Infl. cymose, corolla-lobes with transverse, reddish markings.

G. rusbyi Rose.

Ariz. Plant resembling a dwarf *Dudleya*. Fls. white, spotted reddish.

KALANCHOE

From Chinese name. Sometimes spelled *Calanchoe*. Succulent herbs or sub-shrubs with interesting foliage and flowers. Usually robust erect plants.

K. dyeri N. E. Br.

Trop. Afr. A fine species, 2½ ft. high. Fls. with pale green tube 1-1½ in. long, and a pure white spreading limb of lanceolate-acute lobes 1 in. long.

K. fedtschenkoii Hamet & Perrier.

Madagascar. Lvs. stalked, smooth, 1-2 in. long, crenate. Fls. nodding, bright orange.

K. flammea Stapf.

Trop. Afr. 12-18 in. high, little branching. Fls. yellow-orange and scarlet.

K. marmorata Bak.

Abyssinia. St. stout and branching. Fls. creamy white or yellowish.

K. schimperiana A. Rich.

Abyssinia. Tall to 3 ft. high, probably herbaceous.

K. somaliensis Bak.

Somaliland. Erect, shrubby. Lvs. 4-6 in. long, toothed, reddish. Fls. in a loose cyme to 10 in. long, white, faintly tinged yellow.

K. thyrsiflora Harv.

S. Afr. Plant 2-4 ft. tall, glabrous. Lvs. opposite, sessile, pale green, 4 in. long. Infl. an oblong panicle or thyrsus. Corolla orange. w.

KITCHINGIA

Personal name. Succulent, glabrous, perennial herbs, allied to Bryophyllum and closely related to Kalanchoe to which it is sometimes united. It differs in its mostly nodding fls. that have shorter corolla-lobes and spreading carpels with long styles. Sts. flexuose; fls. large for the plant, bright red. The genus is confined to Madagascar.

K. mandrakensis (Perrier) Berg.

(**K. peltata** Hort.)

Madagascar. St. erect. Lvs. peltate, stalked, downy. Fls. to 1 in. long or more, red and showy.

MONANTHES

Named for the often solitary fl. Closely allied to Cotyledon and Sempervivum. Dwarf plants with lvs. either in dense rosettes or distant on fragile sts.

M. atlantica Ball.

(**Sedum atlanticum** Maire.)

Canary Isls. and Morocco. Lvs. in dense rosettes, less than $\frac{1}{4}$ in. long. Fls. golden yellow, red-spotted on back.

OLIVERANTHUS

Named for G. W. Oliver, U. S. Dept. of Agriculture. A genus of one species related to Cotyledon or Echeveria.



J. W. COLLINGE PHOTO



OBERT PHOTO

Desert plants are well adapted to a sunny rock-garden as in this private estate. A careful grouping of plants as to form and color,—both in pots and in the ground—produces a strikingly picturesque effect.

O. elegans Rose.

Mex. Subshrub, 12-20 in. high. Fls. bright red with yellow tips.

PACHYPHYTUM

Greek name, thick plant. Caulescent, more or less branched, with very thick lvs. which are often terete.

P. aduncum (Bak.) Rose.

(*Cotyledon adunca* Bak.)

Mex. St. 1 to 2 ft. tall. Lvs. thick, nearly terete, greyish. Fls. in simple raceme, rose-pink at tip, pale yellow at base and within.

P. amethystinum Rose.

Mex. To over 4 in. high. Lvs. thick gray, overlaid with rosy pink.

P. bracteosum Klotzch.

Mex. Oblanceolate, thickish lvs. Fls. bright red.

P. uniflorum Rose.

Mex. Curious thick lvs. Sts. one-flowered. Rare.

ROCHEA

Named after de la Roche, French botanist. Succulent shrubby plants.

R. coccinea D C.

(*Crassula coccinea* Linn.)

Cape. Plant robust, shrubby, 1-2 ft. high. Lvs. small, flat, distinctly 4-ranked. Fls. bright scarlet.

SEDUM

From Latin, sedere, to sit. The plants fix themselves on rocks and walls. Succulent herbs, rarely subshrubs, mostly hardy and perennial, useful for rockeries.

S. acre Linn.

Europe, Asia Minor, N. Asia, N. Africa. A small creeping evergreen, forming a mat. Fls. bright yellow.

S. adolphi Hamet.

Mex. A loosely bushy, very fleshy, evergreen perennial. Lvs. golden yellow. Fls. white.

S. aizoon Linn.

Siberia, Mongolia, Manchuria, China, Japan. Herbaceous perennial, quite leafless in winter. Stems 1-1½ ft. high. Fls. yellow to orange.

S. album Linn. STONECROP.

Europe, W. Asia, Siberia, N. Afr. Small, creeping, evergreen perennial, soon forming a large mat. Fls. white|
w.

- S. album var. murale** (Linn.) Hort.
Similar to type, but foliage purple. Fls. pinkish.
- S. allantoides** Rose.
Mex. Evergreen, smooth perennial; branches leafy, erect, 1 ft. high. Lvs. cylindrical, erect, white-glaucous. Fls. greenish white.
- S. altissimum** Poir.
S. Europe, N. Afr., Asia Minor. 6 in. to 2 ft. high; sts. decumbent. Lvs. awl-shaped, glaucous. Fls. greenish white. Common.
- S. amecamecanum** Praeg.
Mex. Small, erect, evergreen sub-shrub, 6 in. or more in height. Lvs. thin, flat, bright green. Fls. pale buff yellow.
- S. amplexicaule** D C.
(**S. tenuifolium** D C.)
S. Europe, Asia Minor, Algeria. Small perennial, withering in summer, green for rest of year. Fls. golden-yellow.
- S. anglicum** Huds.
W. Europe. Perennial, about 1 in. high, glabrous, evergreen; barren shoots trailing or erect, forming dense mats. Fl.-sts. about 2 in. high. Lvs. crowded, alternate, becoming red-tinged. Fls. white or rosy tinted. Dislikes drought.
- S. brevifolium** D C.
S. W. Europe, Morocco. Minute, evergreen perennial, creeping, 1-2 in. high. Lvs. bead-like, white-mealy. Fls. white.
- S. compactum** Rose.
Mex. Evergreen, perennial, minute, forming a close greyish mat. Fls. white.
- S. confusum** Hemsley.
Undoubtedly Mex. Evergreen, shrubby perennial, forming a bush 1 ft. high and wide. Fls. yellow.
- S. crassipes** Wallich.
(**S. asiaticum** Clarke.)
Himalayas, Cent. China, Yunnan. Smooth herbaceous perennial. Sts. erect, unbranched, 6-12 in. high. Fls. yellowish-white to greenish.
- S. dasyphyllum** Linn.
(**S. corsicum** Duby.)
Europe, N. Afr. Small evergreen, gray tufted perennial, 1-2 in. high. Lvs. like pinkish-gray beads. Fls. white to pinkish.
- S. dasyphyllum var. glanduliferum** Moris.
Like the type, but minutely glandular-hairy in all its parts. Commonly cultivated.
- S. dasyphyllum var. sundermanni** Praeg.
Spain. Larger than type. Fls. large. w.
- S. dendroideum** Moc. & Sessé.
Mex. Shrub with many erect sts. Lvs. bright green, blunt, often with whitish or reddish margin. Fls. bright yellow, in much-branched panicles.

- S. diffusum** S. Watson.
Mex. 6 in. high. Fls. white.
- S. divergens** S. Watson.
W. N. Amer. Small, creeping, evergreen perennial. Sts. prostrate with reddish branches. Fls. bright yellow.
- S. douglasii** Hook.
W. N. Amer. Small, stout, erect, evergreen perennial; barren shoots 1-3 in. high. Fls. bright yellow.
- S. ewersii** Ledeb.
W. Himalayas to the Altai, Manchuria and Mongolia. Herbaceous perennial, dying back in winter to a short, spreading, much-branched, twiggy rootstock. Sts. 6-12 in. Fls. purplish pink.
- S. fabaria** Koch.
Britain to Cent. Europe. Herbaceous perennial. Sts. upright, 8-16 in. high. Fls. lilac-purple.
- S. hirsutum** Allioni.
S. W. Europe. Small, tufted evergreen perennial, green (reddish in exposure), hairy throughout. Fls. white.
- S. hirsutum var. baeticum** Rouy.
S. France, Portugal, Pyrenees. More robust. Fls. white.
- S. hispanicum** Linn.
From Switzerland east to Persia. Generally annual; small plant, 2-6 in. high. Fls. white. mnh.
- S. hispanicum var. minus** Praeg.
Switzerland east to Persia. Perennial; smaller in all its parts. mnh.
- S. kamtschaticum** Fisch. & May.
N. E. Asia. Perennial without barren shoots. Sts. arising in late summer, remaining short and leafy throughout the winter, flowering and dying in the following season; ascending, 6-9 in. long. Fls. orange-yellow.
- S. lenophylloides** Rose.
Mex. A slightly scabrid perennial. Sts. erect, leafy, 2-12 in. Fls. greenish white.
- S. lineare** Thunbg.
Japan, China, Luchu Archipelago. Sts. erect 3-5 in. tall. Lvs. gray-green, in threes. Fls. pale yellow.
- S. lineare var. variegatum** Praeg.
Garden form. Lvs. margined, white. Sts. pink. Fls. paler yellow. w.
- S. lydium** Boiss.
Asia Minor. Tiny evergreen perennial, forming a bright green mat; barren shoots 1 in. high. Fls. white. mnh.
- S. mexicanum** Br.
Mex. Semi-deciduous, 3-4 in. high, mat-forming. Lvs. in sets of three, yellowish green. Fls. yellow.
- S. middendorffianum** Maxim.
E. Siberia, N. Manchuria. Tufted perennial. Sts. many, 6-12 in.; erect, unbranched. Fls. bright yellow.

- S. moranense** H. B. & K.
S. Mex. Small, bushy plant, 3-4 in. high, with much-branched red sts. Fls. white.
- S. multiceps** Coss & Dur.
Algeria. Small, sub-deciduous, much-branched, bushy plant, 3-4 in. high. Fls. yellow.
- S. oreganum** Nutt.
(**Gormaniana oregana** Br.)
W. N. Amer. Small, creeping, evergreen perennial, forming a green mat, tinged red. Fls. yellow. mnh.
- S. pachyphyllum** Rose.
Mex. Large, very fleshy, rather shrubby, evergreen perennial. Lvs. similar to *S. allantoides*, but crowded at ends of sts., with thicker, reddish tips. Fls. bright yellow.
- S. palmeri** S. Watson.
Mex. Evergreen perennial of sprawling habit. Sts. decumbent, 6-9 in. high. Lvs. glaucous, red-tipped, in flattened terminal rosettes. Fls. orange.
- S. praealtum** D C.
Mex. A much-branched low bush, to 2 ft. high and wide. Fls. yellow. Common.
- S. praealtum var. cristatum** D C.
Garden form, fasciated.
- S. pruinatum** Brot.
Portugal. Slender, evergreen perennial, with erect, sparingly leafy, flowering sts., 6 in. high. Fls. straw-colored.
- S. reflexum** Linn.
Europe. Creeping, evergreen perennial, forming a loose mat. Fls. bright yellow.
- S. reflexum var. cristatum** Hort.
Branches crested, otherwise as type.
- S. retusum** Hemsley.
Mex. Erect, evergreen, sub-shrub about 1 ft. high, much branched. Lvs. small, notched. Fls. white. mnh.
- S. rupestre var. forsterianum** Smith.
W. Europe. Evergreen, creeping perennial, forming a mat. Infl. much branched. Fls. golden yellow.
- S. sarmentosum** Bunge.
China, Japan. Perennial; shoots slender and prostrate. Lvs. in threes. Fls. bright yellow.
- S. sempervivoides** Fisch.
(**S. sempervivum** Ledeb.)
Asia Minor and Caucasus. Biennial, pubescent, 2-8 in. high; basal lvs. in a rosette, 40-50, green and red. Fls. scarlet. Apparently rare in cult., very showy; the fl. color is almost unique in the genus.
- S. sexangulare** Linn.
Europe. Small, evergreen perennial, forming a fresh green mat. Sts. creeping, much branched. Fls. yellow.
- S. sieboldii** Sweet.
Japan. Herbaceous, 6-8 in. high; branches slender, erect, afterwards curved. Lvs. in whorls of 3, round, glaucous, red-margined, deciduous. Fls. pink.

- S. sieboldii var. variegatum** Hort.
Japan. Herbaceous, variegated, 6-8 in. high; branches slender, erect, afterwards decurved. Fls. pink.
- S. spathulifolium** Hook.
British Columbia to Calif. Small, evergreen perennial, forming a close, flat clump, tinged red in exposure. Fls. bright yellow.
- S. spathulifolium var. purpureum** Praeg.
Garden form. Similar to the type in habit, etc., but lvs. deep red.
- S. spectabile** Bor.
Japan, Cent. China. Robust, herbaceous perennial, 1-1½ ft. high. Sts. erect, leafy, unbranched. Fls. pink.
- S. spectabile var. purpureum** Hort.
Like the type, but fls. deep red.
- S. spurium** Bieb.
Asia Minor and Persia, also escaped in N. Maine and Newfoundland. Perennial, barren shoots trailing. Lvs. flat, spatulate, toothed. Fls. in dense, flat head, white or pinkish.
- S. spurium var. coccineum** Hort.
Similar to type. Fls. crimson.
- S. stahlia** Solms.
Mex. Evergreen perennial, finally downy. Sts. erect, seldom branched, 4-8 in. long. Lvs. bead-like, easily detached, bronzed. Fls. yellow.
- S. stellatum** Linn.
S. Europe. Sts. stout, leafy, 2-6 in. long. Fls. purplish.
- S. stoloniferum** Gmel.
Asia Minor, Caucasus, Syria, Persia. Semi-evergreen creeping perennial, forming a mat. Fl. stalks 6 in. high. Fls. rose.
- S. telephioides** Michx.
S. Pa. to W. N. Y., to S. Ind., N. C. and Ga. Herbaceous perennial. Sts. 6-10 in. high. Deciduous. Fls. flesh-colored.
- S. ternatum** Michx.
E. U. S. Low, evergreen perennial, forming a pale green tuft, with barren and flowering shoots. Fls. white.
- S. treleasii** Rose.
Mex. Very fleshy, glaucous, evergreen perennial. Sts. at first erect, later sprawling. Lvs. grey. Fls. bright yellow.
- S. woodii** Br.
Oregon. 4 in. high. Fls. yellow.
- S. yosemitense** Br.
Yosemite, Calif. Small, evergreen perennial; forming a loose mat; barren sts. ending in a rosette of lvs. Fls. bright yellow.

SEMPERVIVUM

Latin, living forever. Thick, fleshy, usually stemless, perennial herbs or subshrubs which are used for carpet bedding, rockeries, and the like. Not suitable for dry locations.

- S. arachnoideum** Linn.
S. Europe. Barren rosettes 2-3 in. diam., covered with cob-web-like threads, the new ones crowded and sessile. Fls. bright red.
- S. arachnoideum var. hookeri** Hort.
Larger rosettes than the type, flattened-convex on top, strongly white-hairy, especially at center.
- S. blandum** Schott.
(**S. rubicundum** Schur.)
Transylvania. Sts. 7-10 in. high; rosettes 1½-2 in. diam., bright red. Fls. pale rose, midnerve deeper colored.
- S. calcareum** Jor.
France. Rosettes glaucous, brown-tipped, about 2 in. in diam., young ones nearly sessile. Fls. pale red.
- S. doellianum** Lehm.
Switz. and Tyrol. Closely related to *S. arachnoideum*, by some authorities considered a variant of it.
- S. fimbriatum** Schnittsp. & Lehm.
Pyrenees and Tyrol. Barren rosette, 1-1½ in. diam., the new rosettes nearly sessile. Fl. stalks 6-10 in. Fls. bright red.
- S. flagelliforme** Lehm. & Schnittsp.
Alps of Savoy. Barren rosette, 1-1½ in. diam., with the lax new rosettes on long spreading peduncles. Lvs. 40-50 to a rosette, pale green. Fls. about 1 in. across, bright red, about 6-8 in a dense head.
- S. glaucum** Ten.
(**S. acuminatum** Bak.)
(**S. schottii** Lehm. & Schnittsp.)
Cent. Europe. Barren rosettes, 2-3 in. in diam., the copious young ones sessile or nearly so; fl. stalk 6-12 in. high. Fls. pale or bright red.
- S. globiferum** Linn.
Russia. Rosette 1½-3 in. across, rather flattened, the young ones globular. Fls. pale greenish yellow, striped red.
- S. hirtum** Linn.
(**S. allionii** Nym.)
S. Europe. Barren rosettes 1-1¼ in. diam., the new ones not rolled up into balls and breaking away as in *S. soboliferum*. Lvs. about 50 to a rosette, pale gray-green, outer lvs. faintly tinted red. Fls. pale yellow.
- S. laggeri** Schott.
Switzerland. Resembles *S. arachnoideum*, but larger. Rosettes up to ¾ in. diam., open, the young ones close to old ones or on peduncles. Fls. bright rose.
- S. lamottei** Bor.
France. Barren rosettes 3-4 in. diam., outer lvs. green with only the faintest tint of red-brown at the tip. Fl.st. often more than 1 ft. high. Fls. 1 in. across, pale pink. Has been referred to *S. tectorum* by some authors.

S. pittonii Schott.

Styria. Rosettes 1-1½ in. diam., always open; lvs. 60-80 to a rosette, pale green with large light red blotches. Fls. 12-20, small, yellowish white. Rare in cultivation.

S. soboliferum Sims.

(**S. globiferum** Linn.)

Austria. Barren rosettes globose, 1-1½ in. diam., the many new rosettes attached to the parent only by a slender thread and easily becoming detached from it and rolling about. Lvs. 60-80 to a rosette, pale light green, outer ones tinted with red-brown. Fl. st. 6-9 in. Fls. pale yellow.

S. tectorum Linn. HOUSE LEEK

(**S. robustum** Jord. & Four.)

Europe and Orient. Barren rosettes, ¾ in. diam. Fls. pale red. Common.

S. tectorum var. **pyrenaicum** Hort.

This is offered in the trade.

S. tomentosum Schnittsp. & Lehm.

(**S. webbianum** Hort.)

S. Europe. Similar to *S. arachnoideum*, but has white tomentose rosettes, flatter and more compact.

S. triste Hort.

A rare form allied to *S. tectorum*. Barren rosettes 2-3 in. in diam.; lower part of lvs. dull drab-green, the whole upper part bright red-brown; fl.-st. robust as in *S. tectorum*. Fls. about 1 in. across, bright red, deeply tinted with red-brown.

STYLOPHYLLUM

Derived from the Greek word *stylos*, having reference to pencil shaped leaves. A genus similar to *Dudleya* but differs in having spreading corolla segments.

S. densiflorum Rose.

Calif. Plant forming dense clumps. Lvs. 3-5 in. long, terete. Fls. white or pinkish.

S. hassel Rose.

Sta. Catalina Isl. Acaulescent, glaucous. Lvs. tapering to 6 in. long. Fls. yellowish.

S. orcuttii Rose.

S. Calif. and adj. isls. Rather stout and very glaucous; woody at base. Fls. rose-colored.

UMBILICUS

From Latin word for navel, from the shape of the lf. Related to *Cotyledon*.

U. pendulinus D C.

(**Cotyledon umbilicus** Linn.)

W. Eur. Perennial, 6-12 in. high, simple or slightly branched, leafy at base. Lvs. peltate. Fls. pale yellow, nodding in tall, one-sided racemes. Suitable for rock gardens.

URBINIA

Mexican plants closely related to *Echeveria*. Compact rosettes of turgid, pointed, very waxy lvs., often tinged reddish. Attractive. Calyx-lobes shorter than corolla tube.

U. agavoides (Lem.) Rose.

(*Echeveria agavoides* Lem.)

Mex. Small and compact. Fls. orange.

U. purpusii Rose.

Mex. Lvs. purplish in dense rosettes. Fls. green, pinkish outside.

EUPHORBIACEÆ

Named in honor of Euphorbus, physician to King Juba, according to Pliny. Spurge family. Herbs, shrubs or trees, of greatly varying habit, sometimes fleshy and cactus-like, with milky juice.

EUPHORBIA

Spurge. Of very diverse habit, from succulent cactus-like trees to low or prostrate herbaceous weeds.

Note:—Identifications are uncertain in some cases and this list must be considered as provisional only.

E. abyssinica Raeuschel.

Abyssinia. Tree, 10-35 ft.

E. ammak Schwfth.

S. Arabia. Tree to 35 ft. Here a small tree.

E. antisiphilitica Zucc.

Mex. Slender, erect, rod-like branches, 1-3 ft. high, almost leafless.

E. bupleurifolia Jacq.

S. Afr. St. ovate-spherical, 3 in. thick; 4-5 in. high; resembling a pine cone. Lvs. at top.

E. canariensis Linn.

Canary Isls. Shrub, 15-20 ft. m.

E. candelabrum Trem. **var. erythrææ** Berg.

Eritrea. Erect shrub, branches 3-4 in. thick, furrowed at sides, angles 3-4, wing-like.

E. caput-medusæ Linn. MEDUSA'S HEAD.

S. Afr. Short-stemmed with snaky branches, 2 ft. long. Common.

E. cereiformis Linn.

S. Afr. Columnar shrub, often branching, 2-3 ft. b.

E. clava Jacq.

S. Afr. Shrub, 2-3 ft. high.

E. coerulescens Haw.

(**E. virosa var. coerulescens** Haw.)

S. Afr. Low, shrubby. Spines black. New growth blue, spines brown.

- E. cooperi** N. E. Br.
Natal. Tree-like, to 18 ft. Rare.
- E. dendroides** Linn.
Medit. reg. Shrub or small tree, from 6-10 ft. g.
- E. echinus** Hook. & Coss.
S. Morocco. Much branched shrub.
- E. fimbriata** Scop.
(**E. mammillaris** Linn.)
Cape. Low, fleshy bush. Sts. and branches about 1 in. thick, 7-12 ribbed, bright green when young, turning gray with age. w.
- E. frankiana** Berg.
? Shrubby, up to 3 ft. c.
- E. fulgens** Karw.
(**E. jacquiniaeflora** Hook.)
Mex. Small shrub with slender, drooping branches. Fls. red. w.
- E. fulva** Stapf.
(**E. elastica** Altam. & Rose.)
Mex. Small tree. Lvs. lanceolate, acute, pubescent. A source of rubber.
- E. gorgonis** Marl.
Cape. Dwarf, prostrate.
- E. grandicornis** Goebel.
Origin unknown. Large shrub or arborescent. c.
- E. grandidens** Haw.
S. Afr. Tree to over 30 ft. Here a tall shrub. m.
- E. hexagona** Linn.
S. Afr. Columnar, branched to 2½ ft. m.
- E. heterophylla** Linn.
E. and Cent. U. S. to Peru. 1-3 ft. high. hp.
- E. inermis** Mill.
(**E. viperina** Berg.)
S. Afr. Resembles *E. caput-medusæ* but smaller; branches about ½ in thick, 12 in. long.
- E. ingens** E. Mey.
S. Afr. Tree 10-35 ft. high in native habitat, forming a broad crown. Branches deeply ribbed, ribs 5-8, undulate, spines ascendent, stout, short, black areoles free of spine-base. Lvs. small, acute, rounded-triangular.
- E. lactea** Haw.
India, Moluccas. Shrub, or arborescent.
- E. lactea** var. **cristata** Hort.
Garden form. Branches fasciated and crested. m.
- E. ledienii** Berg.
S. Afr. Tall shrub of candelabrum-like habit. Sts. 2-3 in. thick with 5-8 angles.
- E. mauritanica** Linn.
Cape. Bush to 3 ft. high; long slender branches. w.
- E. meloformis** Ait. MELON SPURGE.
S. Afr. Cespitose, low. d.
- E. morinii** Berg.
S. Afr. Resembles *E. pentagona*, except more branching. Lvs. more persistent, narrow, ½ in. long.

- E. myrsinites** Linn.
Europe. Many declined sts. covered with small gray green
lvs. in close spirals. w.
- E. neriifolia** Linn.
E. Indies. Arborescent or shrubby. Lvs. usually con-
spicuous, large, bright green. mnh.
- E. neriifolia var. cristata** Linn.
Similar to type, but branches fasciated.
- E. obesa** Hook.
Cape. Globular. mnh.
- E. officinarum** Linn.
N. Afr. Resembles *E. echinus*. Shrub; branches 9-13
angled. Spines yellowish to gray. Lvs. minute.
- E. ornithopus** Jacq.
S. Afr. Much-branched half-shrub; joints 1 in. or less
thick, short-cylindrical.
- E. parvinamma** Boiss.
(**E. caput-medusæ var. minor** D C.)
S. Afr. St. short with many radical branches. b.
- (**E. pendula** Link. See *Sarcostemma*.)
- E. pentagona** Haw.
(**E. heptagona** Berg.)
Cape. St. erect, 1-2 in. thick; branches 6-7 angled;
spines few, yellowish. Lvs. $\frac{1}{4}$ in. long or more. Fls.
yellowish green.
- E. piscatoria** Ait.
Madeira. Shrub to 4 ft. high with attractive fls. mnh.
- E. polygona** Haw.
S. Afr. Columnar, 4-5 ft. Rare.
- E. pseudocactus** Berg.
? Shrubby, much branched. mnh.
- E. pteroneura** Berg.
Mex. (?) A low shrub with erect, jointed branches, $\frac{1}{2}$ in.
thick, with 5-6 angles formed by sharp low ridges decurrent
from the lf.-bases. Lvs. reduced, soon deciduous.
- E. pulvinata** Marl.
S. Afr. Resembles *E. echinus*, except angles more blunt,
spines thicker.
- E. regis-jubæ** Webb.
Teneriffe. Branching shrub. w.
- E. resinifera** Berg.
S. W. Morocco. Much-branched shrub.
- E. schimperi** Presl.
S. Afr. Similar to *E. tirucalli*, except branches not
whorled; semi-succulent shrub about 6 ft. high.
- E. similis** Berg.
(**E. natalensis** Hort.)
? Columnar, branched 12 ft. e.
- E. splendens** Bojer. CROWN OF THORNS.
Madagascar. Much-branched shrub to 4 ft. Common.
- E. stapelioides** Boiss.
S. Afr. Similar to *E. bupleurifolia*.

E. submamillaris Berg.

(**E. imbricata** Hort.)

Cape. Belongs to group *Anthacantha*, and may be distinguished by the angles being furrowed transversely, with higher ribs, areoles ending in pointed tubercles; spines slender. Fls. red-brown.

E. tirucalli Linn. MILK-BUSH.

E. Afr., India, Ceylon, Java. Shrub or tree to 35 ft. Common.

E. triangularis Desf.

S. Afr. Tree-like.

E. xylophyloides Brongn.

Madagascar. Shrub or tree.

PEDILANTHUS

Greek name, shoe-flower. Low, tender cactus-like shrubs, grown in collections of succulents; sts. thick and fleshy, juice milky; lvs. alternate.

P. tithymaloides Poit.

(*Euphorbia tithymaloides* Linn.)

Fla. to Venezuela. St. 4-6 ft. high. Fls. red or purple.

SYNADENIUM

Greek name, indicating the united involucre glands. Thick branched tropical shrubs.

S. grantii Hook.

(*Euphorbia grantii* Hort.)

Trop. Afr. Shrub 10 ft. or less high, branched. Deciduous.

FOUQUIERIACEÆ

These plants are interesting as being an example of an order far removed from the *Cactaceæ* in flowers and fruit but reduced to something of their habit by the desert conditions. Small trees or shrubs, becoming leafless in dry weather; leaves fleshy.

FOUQUIERIA

Named in honor of Pierre E. Fouquier, a French professor of medicine at Paris. Candlewood family.

F. splendens Engelm. OCOTILLO; CANDLE FLOWER.

W. Tex. and Ariz. to S. Calif. Shrub. 6x25 ft.; branching near the base. Fls. scarlet or brick red bunched around end of st. w.

IDRIA

Monotypic genus of desert tree bearing a panicle of yellow fls. at top of st.

I. columnaria Kellogg.

L. Calif. Trunk swollen at base, 6 ft. high or more, bearing numerous slender branches.

LILIACEÆ

Classical Latin name, *Lilium*. Lily family. Herbs, shrubs or trees, usually with rootstock or bulbs; sometimes climbing.

ALOE

Arabic name. Acaulescent or variously caulescent perennial succulents.

A. arborescens Mill.

Cape. Trunk simple; finally 10-15 ft. high. Lvs. 2x25 in. Infl. elongated. Fls. red. Common.

A. arborescens var. frutescens (Salm-Dyck) Link.

S. Afr. Many sts. Lvs. grayish, 20 in. long and 2½ in. wide. Infl. cylindrical.

A. arborescens var. natalensis Berg.

Cape. Trunk simple, finally 10-15 ft. high. Lvs. 2x24 in. Infl. pointed. Probably most common form.

A. arborescens var. pachythyrsa Berg.

Cape. Trunk simple, finally 10-15 ft. high. Lvs. less glaucous, 2x24 in. Infl. short and thick.

A. aborescens var. ucriæ Berg.

Cape. Shorter trunk and long green lvs. Fls. red.

A. arborescens var. viridifolia Berg.

Cape. Lvs. shorter, not glaucous. Fls. red.

A. aristata Haw.

(**A. longiaristata** R. & S.)

Cape. Dwarf plant not exceeding 6 in.; densely tufted lvs. ending in a fine filament. Fls. bright red.

A. bainesii Dyer.

S. Afr. Large, flat-topped tree, 30-60 ft. high. Copiously branched. Fls. yellowish red.

A. x beguinii Hort.

Hybrid of *A. aristata* and a species of *Gasteria*.

A. cæsia Salm-Dyck.

S. Afr. Trunk simple. Lvs. large, to 2 ft. long or more, by 5 in. wide. Infl. a simple, dense raceme. Fls. reddish, becoming paler.

A. candelabrum Berg.

Natal. To 4 ft. tall. Lvs. 2-3 ft. long, 4 in. wide at base. Fls. red, in long, lax racemes.

A. ciliaris Haw. CLIMBING ALOE.

Cape. St. elongated, scandent. Lvs. thin, fringed, bright green. Fls. bright red. Common.

A. commutata Tod.

S. Afr. Similar in foliage and habit to *A. saponaria*, differing in that infl. consists of several elongated branches.

A. concinna Bak.

Zanzibar. Rosettes of thick spotted lvs. on slender stems. Infl. sparse. Fls. red.

A. distans Haw.

Cape. Branched and prostrately spreading. Lvs. 2x3-3½ in. long, dark green, spotted. teeth yellow. Fls. red.

- A. eru** Berg.
(A. abyssinica Bak.)
 Trop. Afr. Scarcely 2 ft. high. Lvs. 1-1½-3x16-34 in. Infl. 3-6 ft. high. Fls. yellow or orange.
- A. eru var. cornuta** Berg.
(A. abyssinica Hort.)
 Trop. Afr. Sts. stout, often procumbent. Lvs. glaucous-green, blotched, to 2 ft. long, 4-5 in. wide.
- A. eru var. maculata** Hort.
 Lvs. smaller, narrower, with large white spots. mnh.
- A. ferox** Mill.
 Cape. Trunk simple, rarely forked, 3-10 ft. high. Lvs. large, toothed on both sides and margins, glaucous. Infl. 4 ft. high. Fls. greenish yellow.
- A. grandidentata** Salm-Dyck.
 Cape reg. Lvs. recurved-spreading, 2½-3x12-18 in. Infl. 2-3 ft. high. Fls. rosy.
- A. greenii** Bak.
 Natal. Lvs. spreading. 3x15-18 in. Fls. dull red. Rare.
- A. heteracantha** Baker.
 S. Afr.? Densely cespitose. Fls. almost in a head, pale red.
- A. humilis** Haw.
 Cape. Lvs. sub-erect, ¾x4 in. Infl. 1½-2 ft. high. Fls. red or yellowish. Rare.
- A. humilis var. acuminata** (Haw.) Bak.
 S. Afr. Lvs. 4 in. long.
- A. humilis var. echinata** Bak.
 Cape. Lvs. ¾x4 in. Infl. 1½-2 ft. high. Fls. bright red.
- A. humilis var. macilenta** Baker.
 Cape. Lvs. sub-erect, ¾x4 in. Infl. 1½-2 ft. high. Fls. red.
- A. johnstonii** Bak.
 E. Afr., Kilimandjaro region. Stemless, rosettes with flaccid, 2-ranked lvs. that are only ¼ in. wide. Fls. reddish.
- A. x lætecoccinea** Berg.
 Stemless. Lvs. 2x8 in., glaucous. Infl. 3-branched. Fls. bright red, yellow-green at tip.
- A. lateritia** Engelm.
 E. Afr. Large plant densely cespitose. Lvs. 15-20. Fls. scarlet, winter blooming.
- A. latifolia** Haw.
 S. Afr. Very large, to 2 ft. high. Lvs. 6 in. wide, spotted.
- A. lineata** (Ait.) Haw.
 S. Afr. Lvs. 10-12 in. long; 1¼-2 in. wide at base, sharply pointed, striate. mnh.
- A. longistyla** Bak.
 Cape Province. Small plant 7½ in. high. Lvs. in a rosette 3 in. long. Fls. orange.
- A. macrocarpa** Tod.
 Trop. Afr. Cespitose. Lvs. spreading; 2x8-15 in. Infl. 2 ft. high. Fls. light red.
- A. marlothii** Berg.
 S. Afr. Tree-like. w.

- A. mitriformis** Mill.
Cape. Similar to *A. distans* but lvs. larger, upcurved, 2¾-6 in. Infl. 1 ft. or more. Fls. bright red.
- A. x mortolensis** Berg.
Hybrid of *A. variegata* and a *Gasteria*.
- A. myriacantha** (Haw.) Roem. & Schult.
S. Cape. Stemless, roots turnip-like. Lvs. slender, flaccid, grasslike. Fls. pale red.
- A. obscura** Mill.
Cape reg. Lvs. 2-3x8 in.; densely spotted with white above and below. Infl. to 3 ft. high. Fls. red.
- A. parvispina** Schönl.
Cape. Arborescent. Lvs. 4x10 in. Infl. branching.
- A. x paxii** Terr.
Hybrid, probably of *A. striata* and *A. commutata*. Stemless, cespitose. Lvs. with minute teeth, lanceolate, to 3 in. wide. Infl. to 3 ft. high, much branched above. Fls. showy, coral.
- A. percrassa** Tod.
Abyssinia. Lvs. 2½x6-7 in. mnh.
- A. pienaarii** P. Evans.
S. Afr. Lvs. 1¼x2½ in. in a dense rosette, 20-27 in. long; 4-5 in. broad at base. Fls. yellow and red. Rare.
- A. plicatilis** Mill.
Cape. Somewhat repeatedly forking, 3-10 ft. high, not cespitose. Lvs. two-ranked, 1-1½x8-16 in. Infl. 1-3 ft. high. Fls. red.
- A. pluridens** Haw.
S. Afr. Trunk unbranched; finally 8-10 ft. high.
- A. pratensis** Bak.
S. Afr. Lvs. erect, spreading, 1-2x4-6 in. Infl. 1½ ft. high. Fls. yellowish red.
- A. runcinata** Berg.
S. Afr., or possibly garden hybrid. Short stemmed, cespitose. Lvs. 3-15 in., marginal teeth recurved. Fls. inflated at base, red.
- A. salmdyckiana** Schult.
S. Afr. Branching, low. Lvs. arcuately spreading 3-30 in. Infl. 2-3 ft. high. Fls. red. Said to be a hybrid of *A. ferox* and *A. arborescens*. Common.
- A. salmdyckiana** var. **fulgens** Berg.
(*A. fulgens* Tod.)
S. Afr. Less dense form, with stouter trunk. Fls. red.
- A. saponaria** Haw.
Cape. Cespitously clustered. Lvs. 2x6-8 in., spotted. Infl. 1½-2½ ft. Fls. red.
- A. x schimperii** Tod.
Hybrid of *A. striata*. Lvs. glaucous, obscurely striate, margins red, minutely toothed. Fls. constricted above the ovary.
- A. x smaragdina** Berg.
Hybrid of *A. variegata* and a *Gasteria*. Lvs. in many spiral ranks, to 3 in. wide at base, finely toothed at edges, otherwise smooth, with pale spots transversely jointed.

A. speciosa Bak.

N. Afr. Tree 18-25 ft. high, branching. Lvs. very numerous. Fls. from rosy becoming whitish.

A. x spinosissima Hort.

Probably hybrid of *A. humilis* var. *echinata* x *A. arborescens* var. *pachythyrsa*. Resembles *A. humilis* var. *echinata* but is much stronger growing, 2-3 ft. high. Lvs. 6 in. or more.

A. striata Haw.

Cape. Nearly simple. Lvs. upcurved, spreading, 4-6x15-20 in.; glaucous, not spotted, toothless, red-margined. Infl. 2-3 ft. Fls. red or yellowish.

A. striata var. **rhodocincta** Hort.

(*A. hanburiana* Naudin.)

Cape. Lvs. red-margined, toothed.

A. striatula Haw.

Cape. Scandent, resembling *A. ciliaris*. Lvs. longer. Fls. usually yellow.

A. succotrina Lam.

Cape. Scarcely caespitose, the branched st. 3-4 ft. high. Infl. 2 ft. high. Fls. light red.

A. supralævis Haw.

Cape. Not branched, 3-6 ft. high; infl. 3 ft. Fls. red-orange, becoming yellower.

A. tenuior Haw.

Cape. Slender stemmed. Lvs. remote, minutely toothed, 4-6 in. long. Infl. simple raceme. Fls. yellow.

A. variegata Linn. PHEASANT ALOE; QUAIL PLANT.

Cape. Leafy st. 6-9 in. high. Lvs. triangular, three-ranked, dark green, with transverse rows of white dots. Fls. red.

A. vera Linn.

Medit. reg. and introduced through the tropics. Caespitose, the sts. finally 1-1½ ft. high. Lvs. grayish yellow-green. Infl. 2-3 ft. high. Fls. yellow.

A. vera var. **chinensis** Haw.

Asia. Smaller form. Fls. red-tinged. w.

A. zebrina Bak.

Trop. Afr. Somewhat clustered. Lvs. erect, spreading. Infl. 3-4 ft. high. Fls. red.

A. x winteri Berg.

(*A. salmodyckiana* x *A. arborescens* var. *frutescens* Hort.)

Much branched shrub, densely caespitose. Lvs. 2 ft. long x 3 in. wide. Infl. many flowered. Fls. dense, bright orange, yellow-tipped.

APICRA

Greek name, not bitter. Aloe-like plants grown with other succulents. Shortly caulescent small succulents; lvs. spirally arranged or crowded along the st.; fls. greenish, often striped with white, perianth regular.

A. deltoidea Bak.

S. Afr. Sts. somewhat clustered, 6 in. or more high, about 2¼ in. in diam., including lvs. Fls. yellow-green.

A. pentagona var. bullulata (Haw.) Willd.

Cape. St. mostly solitary, erect, 6-12 in. high. Fls. greenish.

CORDYLINE

Name meaning club-like, referring to the fleshy roots. Sts. tall, often woody and palm-like bearing large crowded lvs., striking in their variegation.

C. australis Hook. CABBAGE TREE.

(Dracaena indivisa Hort.)

New Zealand. Often associated with yuccas in planting. Size of small tree, ornamental, beautiful varieties. Fls. in a spike, greenish white.

C. terminalis Kunth.

E. Indies. Many varieties. Many slender, erect sts., cluster of soft lvs. at top. Fls. lilac.

DASYLIRION

The name means tufted lily. These species are sometimes classed with Nolina, differing from Beaucarnea in having 3-winged fr., neither lobed nor inflated, and its trunk differing from Nolina in being more swollen at base.

D. texanum Scheele.

S. and C. Tex. Lvs. $\frac{1}{2}$ in. x 2-3 ft., glossy green. Prickles yellow, turning brown. Infl. 9-15 ft. high. Fr. elliptical, $\frac{1}{4}$ x $\frac{3}{8}$ in., shallow-notched.

D. wheeleri Wats.

S. E. Ariz. and adj. reg. Distinct short trunk. Infl. 7-15 ft. high. Lvs. filiferous.

DRACÆNA

The dragon tree of the Canaries and Teneriffe, famous for the extreme age and size of the trees, having a red, resinous, astringent exudation which was called dragon's blood.

D. draco Linn. DRAGON PALM.

Canary Isls. Arborescent, 60 ft. high, branched. Fls. greenish. Berries orange. Oldest in Santa Barbara about 30 ft. ap.

GASTERIA

Greek name for belly, referring to the usually swollen base of the fls. Mostly acaulescent and small, of similar decorative use and treatment as the Aloe. Fls. conspicuous; variegated lvs., mottled green and white.

G. acinacifolia Haw.

S. Afr. Lvs. 2x14 in., spreading, in a large, 2-ranked rosette. Infl. 4 ft. high. Fls. red with greenish segments.

G. angulata Haw.

S. Afr. Lvs. 2x8-10 in. Infl. 3 ft. high, exceptionally branching. Fls. red with greenish segments.

- G. carinata** Haw.
S. Afr. Lvs. thick, spreading. Infl. 2½-3 ft. Fls. red with greenish segments.
- G. cheilophylla** Bak.
S. Afr. Lvs. in twisted ranks. Infl. 3 ft. high, branched. Fls. red with greenish segments.
- G. lauchei** (Radl.) Berg.
S. Afr. Lvs. 2x8-10 in. Infl. 3 ft. high. Fls. red with greenish segments.
- G. picta** Haw.
Cape. Lvs. in twisted ranks, tongue-shaped, somewhat concave and 3-sided, 1½-2x10-14 in., glossy dark green mottled with round white spots confluent below. Infl. 3 ft. high, branched.
- G. planifolia** Bak.
Cape. St. evident but leafy. Lvs. tongue-shaped, glossy, smooth dark green blotched with oblong white spots in somewhat twisted ranks. Infl. 3 ft. high. Fls. pale-red, nodding, swollen at base.
- G. subverrucosa** (Salm-Dyck) Haw.
Algoa Bay, S. Afr. Similar to *G. verrucosa*, but less rough-tuberclad.
- G. sulcata** (Salm-Dyck) Haw.
S. Afr. Lvs. concavely strapshaped, 4-angled. Infl. 3 ft. high, branched. Fls. red with greenish segments.
- G. verrucosa** Haw.
S. Afr. Cespitose. Infl. 2 ft. high, simple. Fls. bright red with greenish segments.

HAWORTHIA

Named after A. H. Haworth an English authority on succulents. Lvs. usually small, thick, keeled, crowded on the st. or in somewhat elongated rosettes; fls. white, green, or rosy-striped, tubular.

- H. arachnoides** Haw.
S. Afr. Simple. Lvs. upcurved, ½x2-3 in. Fls. rose-lined.
- H. attenuata** Haw.
S. Afr. Cespitose. Lvs. ½x2-3 in. Infl. 2 ft. high. Fls. rosy.
- H. cassytha** Bak.
(**H. reinwardtii** Hort.)
S. Afr. Somewhat cespitose. St. with lvs. 2x6 in. Infl. 1-1½ ft. high. Fls. lined with rose.
- H. coarctata** Haw.
Cape. St. with lvs. 3x6-8 in., cespitose. Fls. lined with red.
- H. cymbiformis** Haw.
S. Afr. Cespitose. Lvs. translucent. Infl. 1 ft. high, simple. Fls. red-keeled.
- H. fasciata** Haw.
S. Afr. Cespitose. Infl. 1 ft. high. Fls. rosy-lined.
- H. icosiphylla** Bak.
Garden form. Lvs. in rosettes, irregularly dotted with few small green warts. Fls. minute, whitish.

H. margaritifera Linn.

Cape. Somewhat caespitose. Lvs. upcurved-spreading, with white tubercles. Fls. green-lined.

H. margaritifera var. granata (Willd.) Bak.

S. Afr. Like type, lvs. shorter and thicker; white spots larger and more prominent.

H. papillosa var. semipapillosa Haw.

Cape. St. short, densely leafy, 8-10 in. tall.

H. rugosa (Salm-Dyck) Bak.

S. Afr. Lvs. rough-dotted, in spiral rosettes, 1x4 in., triangular-lanceolate.

H. tessellata Haw.

S. Afr. Little clustered. Lvs. bristly toothed, spreading. Fls. nerved with green.

H. tortuosa Haw. var. **pseudorigida** Berg.

(**H. subrigida** R. & S.)

S. Afr. St. 4-5 in.; more or less clustered. Fls. rosy-lined.

H. turgida Haw.

S. Afr. Dense recurved rosettes of narrowly-lanceolate lvs., pale green, turgid, translucent.

HESPERALOE

Latin name meaning western aloë. Acaulescent plants with filiferous lvs. like many yuccas, but ephemeral, diurnal, greenish or red fls., recalling those of the true aloes. The most characteristic and unusual feature is the long term of the blooms, from spring to winter.

H. parviflora Coulter var. **engelmannii** Trel. RED FLOWERING YUCCA.

(**H. engelmannii** Kraus.)

S. W. Tex. Caespitose. Lvs. 1-4 ft. Infl. 4-6 ft. high. Fls. coral red. It has a graceful, pendulous stalk; one of the rarest native plants, growing in a small region of southern Tex. Astonishingly, the native collected specimens will not set seed, though cultivated specimens will.

HESPEROYUCCA

Latin name, western yucca. Yucca-like nearly acaulescent plants, feature of the coast range flora of California when in bloom. Lvs. from low crown without trunk; fls. white on tall stalk.

H. whipplei Bak. SPANISH BAYONET.

(**Yucca whipplei** Torr.)

Cent. and S. Calif. Simple or caespitose. Infl. 6-15 ft. high. Fls. white. mnh.

NOLINA

Named for C. P. Nolin, joint author of an essay on agriculture, Paris, 1755. Sub-accaulescent, or small trees, with dracæna-like lvs. and a much enlarged hemispherical base.

N. longifolia Hemsl.

Mex. Rough-barked small tree 5-10 ft. high, with somewhat swollen base and a few short branches crowded at top.

N. parryi Wats.

Extreme S. Calif., Ariz. and L. Calif. Lvs. narrow, grass-like, sharp edged, flexible. Infl. a large panicle.

N. recurvata Lem.

(**Beaucarnea recurvata** Lem.)

S. Mex. Small, tree-like; broad woody base, graceful pot plant when young. Fls. in a panicle, greenish white.

SANSEVIERIA

A variegated leaved plant. Best used as houseplant here. Will thrive without sun.

S. cylindrica Boj.

Trop. Afr. Lvs. to 3 ft. long, terete, dark green. Infl. shorter than lvs. Fls. creamy-white tinged pink.

S. zeylanica Willd.

Trop. Afr. Lvs. 1-3 ft. long, sword-shaped. Fls. whitish green. w.

YUCCA

Long sword shaped lvs. in a rosette with or without trunks; fls. white from tall stalks; midsummer blooming. Desert yuccas will not stand watering here. Most of the non-desert yuccas cannot be potted; the roots will not stand confinement.

Y. aloifolia Linn.

W. Ind. and Mex. to Va. and around Gulf. Slenderly caulescent. w.

Y. aloifolia var. variegata Linn.

(**Y. aloifolia var. tricolor** Hort.)

A variegated form with yellow and rose stripes on lvs.

Y. brevifolia Schott. JOSHUA TREE.

(**Cleistoyucca arborescens** (Torrey) Trel.)

Ariz. Shortly caulescent, to 6-7 ft. high, mostly cespitose. In S. Calif. 15-20 ft high. w.

Y. elephantipes Reg.

(**Y. gigantea** Hort.)

(**Y. guatemalensis** Bak.)

S. E. Mex. and Guatemala. Habit of *Y. aloifolia*, but st. with wide base. Lvs. less sharply pointed and less rigid, but not at all glaucous. Fls. in dense panicles, whitish. Fr. fleshy.

Y. filamentosa Linn.

S. C. to Miss. and Fla. Trunkless. Lvs. 1 in. wide. Infl. 4-12 ft. high. Fls. nearly white.

Y. filamentosa var. variegata Linn.

S. C. to Miss. and Fla. A variegated form with lvs. striped with yellow and pink.

Y. flexilis Carr.

Mex. Lvs. less than 2 in. wide, and infl. long-stalked.

Y. gloriosa Linn.

Coast, from S. C. to Fla. Short-trunked or arborescent. Fls. often reddish tinged. w.

Y. mohavensis Sargent.

W. Ariz and S. Nev. to Calif. and L. Calif. mnh.

Y. rupicola Scheele.

S. Cent. Tex. Dwarf plant, to 2 ft. high. Fls. creamy white.

PORTULACACEÆ

An old Latin name of unknown origin. Purslane family. Herbaceous; leaves often fleshy, sometimes connate.

ANACAMPSEROS

Greek-made name, of no significance here. Succulent herbs with ovate, fleshy lvs.

A. arachnoides Sims.

Cape of Good Hope. Peculiar, cobwebbed, green-leaved succulent. Fls. pink.

A. telephiastrum D C.

Cape. Very fleshy, forming mat. Fls. red.

PORTULACARIA

Similar to *Portulaca*. Glabrous shrub or small tree; lvs. opposite, obovate, fleshy; fls. small, rose.

P. afra Jacq.

S. Afr. Small tree 10-12 ft. high. Fls. pink.

APPENDIX

Doubtful items that are said to be cultivated locally but for whose proper identification both time and material have been lacking.

Aloe brunthaleri.

S. Afr.

Aloe longibracteata.

S. Afr.

Aloe x pseudopicta Berg.

Aloe tingitana.

Morocco.

Cotyledon maxima. ELEPHANT'S EAR.

S. Afr.

Duvalia poweriana. (Family—ASCLEPIDACEÆ).

S. Afr.

Huernia gibbosa.

S. Afr.

Kalanchoe miniata Hilsenb. & Boj.

(*Kitchingia miniata* Bak.)

Madagascar.

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